Pastoral Livelihoods in Danger

Cattle Disease, Drought, and Wildlife Conservation in Mursiland, South-Western Ethiopia

David Turton

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Introduction

This paper is the outcome of a short field study which I carried out in northern Mursiland in September 1994 on behalf of Oxfam (UK and Ireland). The original objective was to focus on the problem of cattle disease and to examine the scope for improving the access of Mursi pastoralists to veterinary services, especially through the training of 'paravets'. Soon after beginning the field-work, however, it became clear that this particular constraint on pastoral production could not sensibly be considered without reference to another, namely the growing shortage of water in dry-season grazing areas, which was forcing herd-owners to subject their cattle to debilitating daily treks through tsetse-infested bush to drink in the Omo, Mago, and Sala Rivers. A third (and potentially the most serious) threat to Mursi livelihoods comes from the 'Southern Ethiopian Wildlife Conservation Project', which began in June 1995. Funded by the European Union, this is the most expensive wildlife project ever undertaken in Ethiopia. Its preliminary phase began in June 1995. It covers three national parks, two of which (the Omo and Mago National Parks) contain between them the main agricultural and pastoral resources of the Mursi. Despite this, the Mursi were neither consulted nor informed about the project during its planning phase, and they stand to carry the main burden of its costs. The documents setting out the aims and methods of the project eipitomise the increasingly discredited 'preservationist' approach to conservation in Africa, according to which local people are the enemies of conservation and should, as far as possible, be excluded from 'protected' areas. In this paper I describe these current and potential constraints on Mursi pastoral production and suggest ways of reducing their impact.

Why the Mursi?

The Mursi are one of several small groups of agro-pastoralists who live in the Lower Omo valley of south-western Ethiopia. Their history over the past twenty years has been one of almost continuous crisis, involving drought, famine, war, migration, and epidemic disease. In coping with and adapting to these conditions, they have had little or no systematic help from governmental or non-governmental agencies, certainly less than their agro-pastoral neighbours, the Bodi, Nyangatom, and Hamar (Figure 1). This is largely because of the inaccessibility of their territory and the absence of any permanent settlements where health, veterinary, and educational services could be provided. Any long-term plans and proposals for economic development in the area — such as the encouragement of tourism and the construction of dams on the Omo for electricity generation and irrigated agriculture — are likely to put even more pressure on vital subsistence resources for the Mursi.

Why pastoralism?

Because of the low and erratic local rainfall, the lower Omo basin is a highly marginal area for rain-fed agriculture. Flood-retreat cultivation along the banks of the Omo is more reliable, but the cultivable area varies significantly from year to year with the height of the flood. Crop pests and birds are a further and frequent cause of poor harvests. But the wooded grasslands which make up most of Mursi territory are, in principle, ideally suited to pastoralism, a mode of subsistence to which they have an overwhelming cultural commitment. This is not simply a matter of sentiment: pastoral products make a vital contribution to their diet, while the exchange of cattle for grain in highland markets is the ultimate stand-by in times of extreme hunger. There could be no more effective, nor

culturally acceptable, way to increase the food security of the Mursi than by helping them to improve the productivity of their herds.

Method and timing of the study

The information I was seeking fell into four main categories:

a. herd structure and dynamics;
b. an overall assessment of the recent history and current state of pastoral production in the area, with particular reference to disease and (increasingly as the study proceeded) water resources;
c. an assessment of the current level of veterinary services available to the Mursi; and
d. the views of local herd-owners on how the pastoral economy might be strengthened with the help of external intervention.

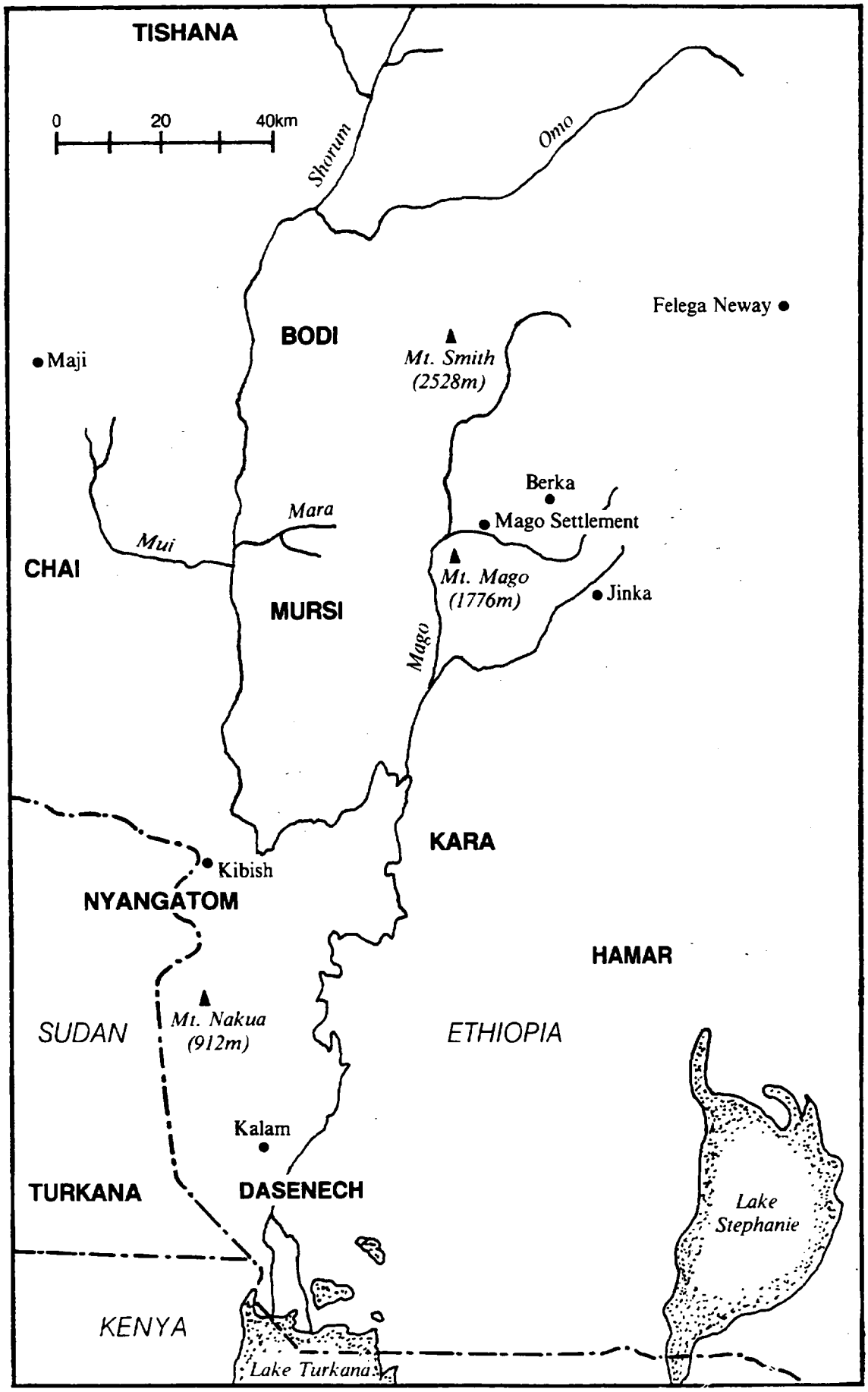
Information in the first two categories obviously overlaps and was collected simultaneously during the field-work, but the first category was the most fundamental, in the sense that it was through asking individuals about the composition of their herds, the progeny history of individual animals, and recent losses that information falling into the second category was most effectively and reliably obtained. I therefore spent a large part of my time asking individuals to go through all the animals of their current herd, describing how they had acquired them, listing the offspring, if any, of female animals, including those which had died or been otherwise disposed of, and listing all those animals which had died over the past year. Information on the present level of veterinary services was obtained from the Mursi themselves, from the Ministry of Agriculture's Animal Health Assistant at Hana, and from Dr Jonathan Geddes, a missionary veterinarian, who has been treating Mursi cattle since January 1994. In order both to gather opinions and seek a consensus on what might be done by an outside organisation to help to sustain the pastoral economy, I proposed to the local herd-owners that they hold a public meeting to discuss this topic. The meeting took place on 6 September 1994 and was in the form of a 'debate' in which any individual who wished could make a speech. The eight speakers included some of the most respected and influential men from the surrounding area. Excerpts from three of the speeches are presented in the Appendix.

We (I was accompanied by my 19 year-old son) were dropped in northern Mursiland by a vehicle from the Jinka Catholic Church on 30 August. We set up camp close to a cluster of three settlements, near the motor track, and were joined the next day by two of the local herd-owners whom I have found in the past to be knowledgeable, patient, and articulate informants. They stayed with us for the remainder of the trip. On 16 September all four of us were transported by Jonathan Geddes to Makki, where I spent three days transcribing and translating the speeches which I had recorded on 6 September, and in conversation with Geddes and our two Mursi companions about options for pastoral development among the Mursi. On 20 September a vehicle from the Catholic Church in Jinka came to Makki, by arrangement, to take us back to Jinka.

Structure of the paper

This paper is divided into four parts. Part I is an outline description of Mursi economy and society, based upon ethnographic research which I have carried out among them over the past 25 years. The aim here is to provide the minimum of background information necessary to enable the reader to make sense of later sections. Part II is an account of herd structure and dynamics, based upon a single settlement of three herd-owners surveyed in September 1994. In Part III I focus on the two major current constraints on Mursi pastoral production, disease and drought, and on the potential threat posed by National Park development to their best dry-season grazing areas. In Part IV I consider how these constraints might be reduced by means of veterinary assistance and water development and by putting pressure on the wildlife authorities to change their existing approach to human activity in and around the Mago and Omo National Parks.

Figure 1: The Mursi and their neighbours (opposite)


TISHANA
0
20
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Berka
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Mago Settlement
Mui
CHAI
Mt. Mago
(1776m)
Jinka
MURSI
Mago
KARA
Kibish
NYANGATOM
HAMAR
Mt. Nakua
(912m)
SUDAN
ETHIOPIA
Kalam
TURKANA
DASENECH
Lake
Stephanie
KENYA
Lake Turkana

Part 1: Background

Population

In 1970, at the end of two years' field-work among the Mursi, I estimated their numbers to be between four and five thousand. In July 1990, during a meningitis epidemic, a little over four thousand Mursi were vaccinated in a Ministry of Health campaign, operating both in northern and central Mursiland. Although it is unlikely that this campaign reached the whole population, it is also unlikely that it fell more than 20 per cent short. The Mursi themselves say that their numbers have increased in the last twenty years, although not by leaps and bounds. My conclusion is that the present population figure lies somewhere between five and six thousand.

Local groups

The Mursi live in an oblong-shaped territory of about 2,000 km^2, bounded to the west and south by the River Omo, to the east by the River Mago, and to the north by the River Mara, a seasonal tributary of the Omo (Figure 1). The population is divided into three major local groups, or *buranyoga* (sing. *buran*), a term which refers to a group of co-resident people, rather than to the locality in which they reside. Thus, while it is possible to draw a territorial boundary around the Mursi on a map and call the area so demarcated 'Mursiland', it would be very difficult to draw similar internal boundaries. What gives these subdivisions of the Mursi their local definition is not that their members live within clearly bounded territorial units, but that they make regular use of certain fixed resources, especially flood land at the Omo, but also land for rain-fed cultivation and watering points for cattle in dry-season grazing areas. They have, in other words, territorial foci, rather than territorial boundaries.

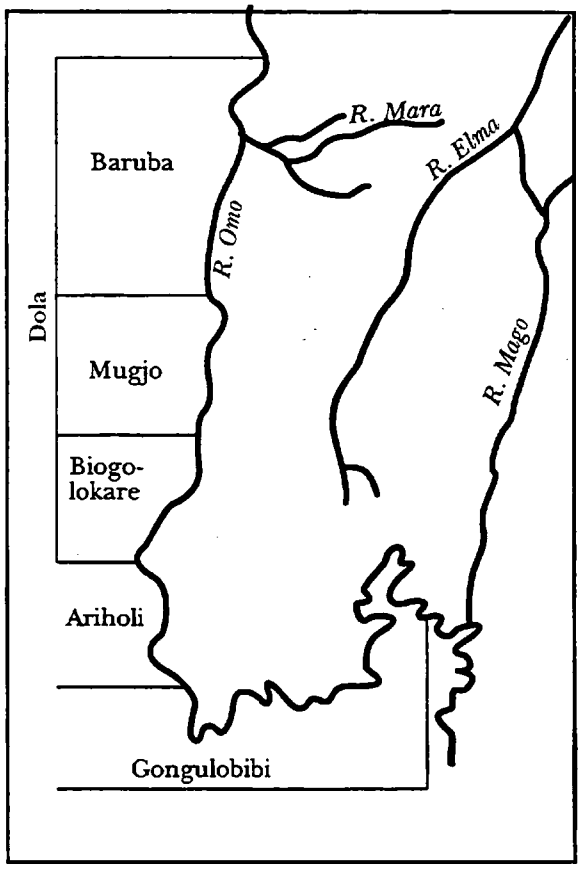

Figure 2: Distribution of territorial groups (buranyoga) along the Omo

The three major *buranyoga* are named, from north to south, Dola, Ariholi, and Gongulobibi. Dola, which is by far the largest, is further divided into three *buranyoga* named, from north to south, Baruba (formerly known as Mara), Mugjo (formerly known as Mako), and Biogolokare (Figure 2). This is a segmentary or 'chinese box' territorial system, in that smaller divisions, down to the residents of a single settlement (also known as a *buran*), are considered miniature replicas and potential equivalents of larger ones, up to the level of the entire Mursi population. Thus Baruba, Mugjo,

and Biogolokare are to Dola what Dola, Ariholi, and Gongulobibi are to the Mursi *buran* as a whole. The three constituent *buranyoga* of Dola are said to be of roughly equal size, Gongulobibi to be smaller than any of them, and Ariholi to be smaller still (Table 1).

Table 1: Mursiland: local groups and estimated maximum population

Buran	Omo cultivation (north to south)	Max. pop'n
Dola		
Baruba	Kuduma, Alaka, Makaro	1,500
Mugjo	Kennokora	1,500
Biogolokare	Ilithey, Gowa	1,500
Ariholi	Kurum	500
Gongulobibi	Bongo	1,000
Total		**6,000**

In 1979, a group of Dola (mainly Baruba) people migrated eastwards to a previously uninhabited part of the valley of the River Mago (called Mako by the Mursi, but not to be confused with another River Mako, a headstream of the Moizoi (Figure 3) after which the Mugjo *buran* was formerly named), where there were better prospects for cultivation (Turton and Turton, 1984). Most of the one thousand or so original migrants have since returned to Mursiland proper (mainly because the Mago Valley is infested with tsetse flies, making it impossible to keep cattle there); but there remains a small agricultural settlement of around 200 Mursi in the Mago Valley (Figure 3). In 1988 the Society of International Missionaries (SIM) established a mission station at the same place, which they call Makki, after the name given to the Mago by the Ari, who live in the nearby highlands.

Topography

Mursiland consists essentially of a volcanic upland, rising steadily from less than 500m above sea level at the Omo to over 1,000m along the Dara range, which forms the watershed between the Omo and its tributary, the Mago. Apart from the higher slopes of this range, the whole of the territory occupied by the Mursi lies below the 1,000m contour. All drainage eventually flows into the Omo, but there are two distinct tributary systems, which may be separated by a line drawn from Shangoro in the south-west to Mt Smith in the north-east (Figure 3). West of this line are a large number of tributaries which flow directly into the Omo, but all of which are dry for most of the year. (This is not necessarily true of the Gura and, still less, Hana rivers, in Bodiland, whose catchment areas extend into the foothills of the Mt Smith range, or Dime Mountains.) East of the Shangoro-Mt Smith line, the drainage flows northwards, via the River Elma (which is also dry for most of the year), into the Sala and then southwards via the Mago into the Omo. Both the Sala and Mago are permanent rivers. The watershed between the two drainage systems is formed by a level ridge and, farther south, by a low range of hills called Arichukgirong.

Rainfall

There are two rainfall maxima, one in March/April, the primary maximum, and one in October/November. The period spanning these two maxima may be regarded as the 'wet' season (*oiyoi*). Mean annual rainfall in Mursiland can only be estimated on the basis of records available from surrounding areas. Karl Butzer's collation of such records suggests a mean of around 480mm for the 'upland plains of the Lower Omo Basin' (1971, p. 26). He notes, however, that 'year-to-year variability is very great' and that rainfall 'seems to increase rapidly between 800 and 1,200 metres elevation'. The annual mean at the Omo National Park Headquarters, on the River Mui, which may be the best available pointer to rainfall conditions in northern Mursiland, is approximately 650.[1] The minimum rainfall necessary to support a purely agricultural way of life by rain-fed cultivation is usually estimated to be 700mm. More important than the annual mean, however, is the probability of enough (but not too much) rain falling, at the right time and in the right place, to make regular and reliable cropping possible. Rainfall in Mursiland is highly unreliable in quantity, timing, and location, and this makes it impossible to describe a 'normal' rainfall pattern, except in the very broad terms just indicated. The rise and fall of the Omo, on the other hand, is affected more by the heavy rain that falls over the Ethiopian Highlands between March and September than it is by the erratic rain that falls over its lower basin. The river reaches its maximum level in August, when it floods and

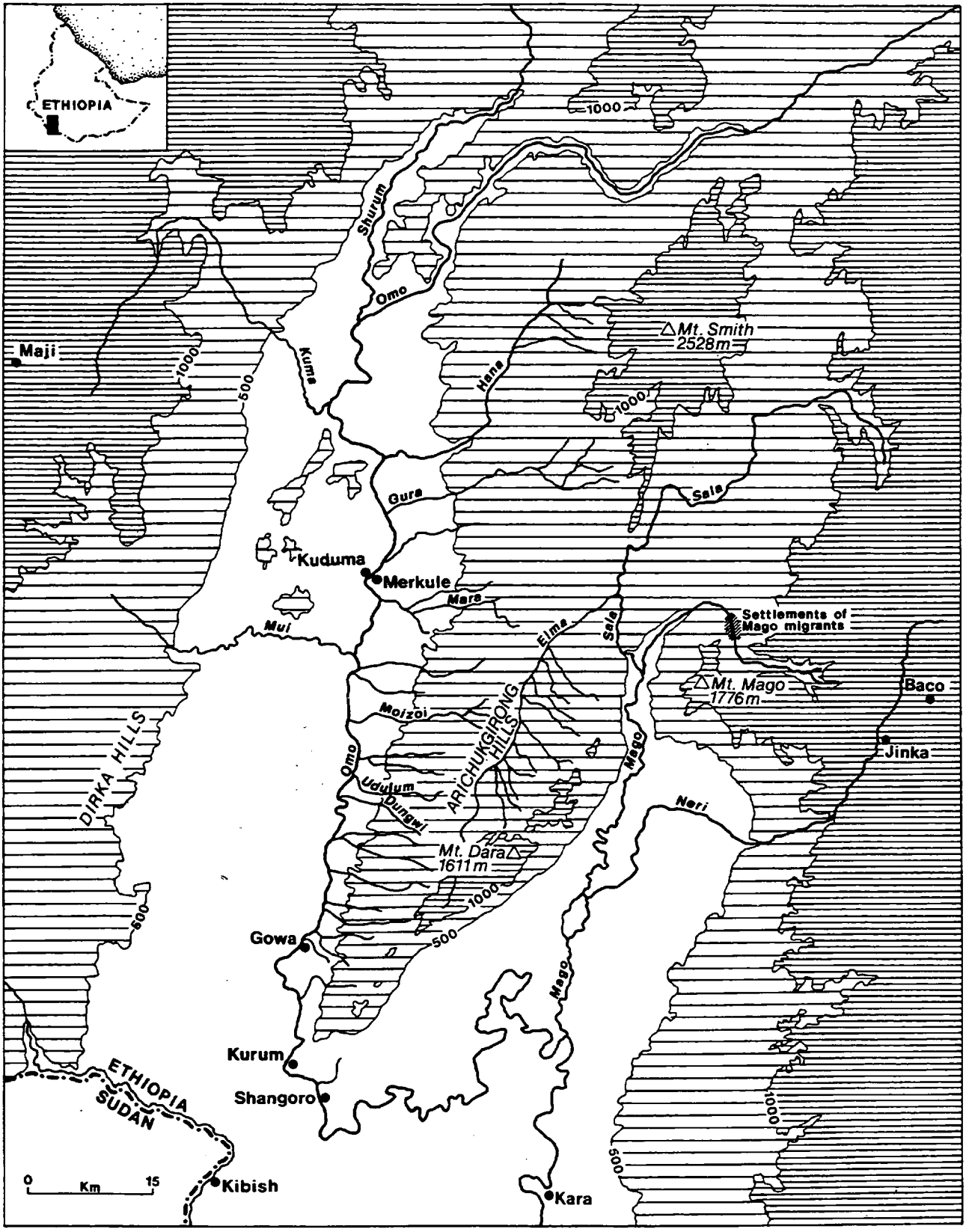

Figure 3: Topography and drainage of the lower Omo valley

deposits layers of flood silt along its banks. More extensive flooding occurs on the inner bends of meanders, but the area flooded in Mursiland is never as great as it is farther south, in the delta plain occupied by the Dassanetch. Having reached its maximum level, the Omo recedes rapidly in September and October and is easily fordable at several places by late December.

Vegetation

Although often described as a 'wilderness', the Lower Omo Valley shows clear marks of prolonged human occupation and use. East of the Omo, between the river and the 500m contour, is a belt of 'bushland thicket', a form of bushland 'where the woody plants form a closed stand through which man or the larger ungulates can pass only with extreme difficulty and in which the land has no value for grazing' (Pratt et al., 1977, p. 373). The bushbelt has grown up, according to the Mursi, within the last 100-150 years. Typical plants found within it are *Sarcostemma, Euphorbia tirucali, Cissus quadrangularis, Sanseviera, Acacia mellifera, Adenium obesum,* and *Plectranthus*. The black 'cotton soil' of the bushbelt gives way abruptly, at the 500m contour, to brown stony soils which support open wooded grassland. Rising steadily towards the Omo-Mago watershed, this grassland has been created by centuries of grazing by domestic animals and by regular burning. Grasses found here include *Cenchrus ciliaris L., Panicum maximum Jacq., Chloris roxburghiana Schult., Saccharum spontaneum L., Eragrostis superba Peyr.,* and *Sehima nervosum (Rottl.) Stapf.* Typical trees are *Commiphera africana, Commiphera pendunculata, Combretum fragrans, Sclerocarya, Lannea,* and *Grewia villosa.*

Subsistence

The Mursi depend on three main subsistence activities, each of which is insufficient and/or precarious in itself but, when taken together with the other two, makes a vital contribution to the economy: flood-retreat cultivation at the Omo, rain-fed cultivation in the bushbelt, and cattle herding in the wooded grasslands above the 500m contour. (They also keep goats and sheep, but in such small numbers that I have decided to focus exclusively on cattle in this paper.) Cultivation is primarily the responsibility of women, and men are mainly responsible for herding. The main crop is sorghum, though some maize is also grown, together with cow peas, beans, and squash. In spanning their three main natural resources (floodland, bushland, and grassland), the Mursi have developed a form of transhumance which, although it takes place over a relatively small area, does not permit fixed residence, in a single locality, for any section of the population. The cycle of seasonal events and activities *(bergu)* is subdivided by counting the intervals between one new moon and the next, beginning with the month in which the Omo reaches its maximum level. Table 2 shows the standard list of seasonal activities which are associated with these numbered divisions of the *bergu*. (For more details of the Mursi calendar, see Turton and Ruggles, 1979.)

The flood crop is planted on narrow silt berms along the banks of the Omo in September and October, and harvested in December and January. Only land which has been inundated by that year's flood is planted, with the result that the cultivable area can vary greatly from one year to the next. Although providing small and variable harvests, flood-retreat cultivation is a vital complement to rain-fed cultivation, for two reasons. Firstly, it takes place at the same places along the river each year, because soil fertility is annually renewed by the flood silt; and, secondly, it is not dependent on the erratic local rainfall which makes rain-fed cultivation so unreliable.

Planting of the rain-fed crop takes place in bush clearings along the westward-flowing tributaries of the Omo as soon as the main rains have begun. This may be any time between the beginning of March and the middle of April. Several varieties of sorghum are grown, all of which have a very short growing season (10-12 weeks) and which are therefore relatively drought-resistant. The onset, duration, and intensity of the rains can vary greatly, however, from one year to the next, often with devastating results for the harvest. Once cleared, a plot is planted continuously for six years or more, by which time there will have been a significant reduction in yield, and a new area of bush must be cleared. It is the uncertainty of rain-fed cultivation, coupled with the limited area available for flood-retreat cultivation, that makes cattle a vital additional resource for the Mursi. Although cattle have much more than merely economic significance for the Mursi and although they probably have fewer than half the number of animals they would need to depend

Table 2: Seasonal events and subsistence activities

Bergu interval	English month	Mursi season	Activities
1	August/September	Telegai	Omo reaches maximum level; storage of rain-fed harvest
2	September/October	Loruwhey	Omo level recedes; preparation of plots for flood cultivation; burning of grass in Elma valley
3	October/November	Loru	Small rains; planting at Omo; cattle to Elma
4	November/December	Su	Weeding at Omo
5	December/January	Su	Bird-scaring at Omo; burning of rain-fed cultivation areas
6	January/February	Su	Harvest at Omo; burning of rain-fed cultivation areas
7	February/March	Su	Storage of flood crop; women move to rain-fed cultivation areas
8	March/April	Oiyoi	Planting of rain-fed crop; men move cattle back from Elma
9	April/May	Oiyoi	Weeding
10	May/June	Oiyoi	Bird-scaring
11	June/July	Oiyoi	Harvesting
12	July/August	Telegai	Drying and threshing of rain-fed harvest

entirely on pastoral products, cattle are considered the last defence against starvation. Not only do they provide something to fall back on in the event of a poor harvest but, in extreme conditions, they can be exchanged for grain within Mursiland itself or in the neighbouring highlands.

During the dry season, from about September to February, the population is divided, on gender and age lines, between the Omo and the eastern grazing areas. Women, girls, and young children live at the Omo, where flood-retreat cultivation is in progress, and men and boys live in rudimentary cattle camps in the Elma valley. By the time of the first heavy rain, in March or April, the Omo harvest has been stored and the women have moved back from the river and started preparations for rain-fed cultivation along the Omo's westward-flowing tributaries. Meanwhile the men and boys have moved the cattle west of the Elma to settlements within one or two hours' walk of the bushbelt cultivation areas. The population then becomes relatively concentrated, although women, girls, and young children continue to live and sleep in the cultivation areas until after the harvest in July or August. They may then spend a month or two in the cattle settlements. This is a period of heightened social activity, enlivened by such public events as weddings and duelling contests. As the Omo flood recedes in September and October, women and girls start moving back to the Omo to begin preparations for flood cultivation, and men and boys take the cattle eastwards, into the Elma Valley. Here the long grass will have been burnt off in readiness for the arrival of the *loru* rains, which then bring on a carpet of young shoots. There is no shortage of grazing in the Elma Valley and it is relatively free of tsetse during the dry season. The problem is a growing shortage of water, which normally makes it necessary to take cattle to the tsetse-infested Omo or Sala Rivers to find adequate water in December and January.

Drought, warfare and ecological change

Over the past 23 years the Mursi have experienced a 'permanent emergency', the immediate causes of which have been drought and military conflict, and the chief result of which has been growing economic vulnerability for households and for the community. Between 1971 and 1973 the rains failed for three years in succession, resulting in a famine of such severity that people were acknowledged to have died of starvation for the first time in living memory (Turton, 1977). The problem of drought was greatly exacerbated by an intensification of armed conflict which affected all the herding peoples of the Lower Omo during these years, disrupting both subsistence activities and economic exchange. The most serious conflict for the Mursi was with their northern neighbours, the Bodi, with whom they had been on terms of peaceful coexistence since a previous conflict in the 1950s. (The Mursi and Bodi speak different, though related, languages and do not intermarry.) After some improvement in both food security and military security (the war with the Bodi came to an end in 1975), the rains were again poor in 1977 and disastrously so in the two following years, when flood levels were also low. Drought returned in the mid-1980s and was accompanied by a new threat: the spread of automatic weapons into the Lower Omo Valley from southern Sudan, where 'tribal militias' were being created by the Khartoum government as part of its fight against the Sudan People's Liberation Army. The first of the neighbours of the Mursi to acquire these weapons in large numbers were the Nyangatom, who, in February 1987, killed at least 200 and possibly as many as 500 Mursi, mainly women and children, in a single attack at the Omo (Turton, 1988, 1989; Alvarsson, 1989). Immediately after the attack, the Mursi evacuated the southern part of their territory and did not use it again for three years.

In 1992 they began acquiring automatic weapons of their own from the Chai (as they call themselves and are called by the Mursi) or Suri, who live west of the Omo and south of Maji. The Chai and the Mursi are culturally and linguistically the same people, and there is much intermarriage between them. The Chai have been even harder hit by drought and famine over the past twenty years than the Mursi, with whom many have taken up permanent residence. They were also subjected, between 1984 and 1986, to fierce attacks from the heavily armed Nyangatom, who drove them from their best grazing areas round Mt Naita on to the lower slopes of the Maji plateau (Abbink, 1993, pp. 220-21). As Abbink recounts, however, the Chai managed to arm themselves in a few years with automatics, which they bought from the Annuak, on the Ethiopia-Sudan border, who had in turn obtained them from the Sudanese army. The main medium of exchange used in these transactions was gold, which the Chai obtained by panning in the Akobo River.[2] By 1991, 'almost every adult male' among the Chai 'carried an automatic rifle' (Abbink, 1993, p. 221). It was at the end of that year that the Chai began selling automatics to the Mursi, bringing them to the Omo, where the Mursi paid the relatively high price of 12 head of cattle for each rifle. The price has since fallen steadily and now stands at four head of cattle. The need to re-arm in the face of the Nyangatom threat has undoubtedly been a very heavy drain on the cattle wealth of the Mursi.

Although drought and warfare have been the most obvious and immediate causes of disaster for the Mursi during these years, there have also been long-term ecological processes at work which can be traced back at least to the end of the last century and of which the extended crisis of the past twenty years has merely been the culmination. Ecological changes in the Lower Omo Valley during this century have all been related to a lowering in the level of Lake Turkana, due to reduced discharge from the Omo and thus to reduced rainfall over the Omo basin. According to Karl Butzer (op.cit., p. 123), the lake level fell 20m between 1896 and 1955 and then rose 4 or 5m during the early 1960s. Drawing on field-work conducted between 1967 and 1969, he concluded that 'contemporary trends ... appear to be positive' (p. 124), but he was writing before the drought years of the 1970s and 1980s, which have presumably resulted in a renewal of 'negative trends' up to the present. In any event, the drastic and rapid drop in the level of Lake Turkana during the first half of the twentieth century resulted not only in a reduction of land liable to flooding along the banks of the Omo but also, because of the falling water table and improved drainage, in the drying out of its westward-flowing tributaries in Mursiland and a growth of woody vegetation in the vicinity of the river (Carr, 1977, p. 65). It was probably this vegetational

change, aided perhaps by cultivation and grazing pressure,[3] which allowed tsetse, already present in the riverine forest, to penetrate the wooded grassland east of the 500m contour,[4] a process which is reported by people today in their fifties and sixties to have increased steadily during their lifetimes.

With the progressive deterioration of their flood-retreat harvests and the inroads made into their herds by epidemic diseases and trypanosomiasis, the Mursi were becoming increasingly dependent, long before the crisis events of the past 20 years, on their most unreliable means of subsistence: rain-fed cultivation. The consequent need to find new areas of untouched woodland that could be cleared for cultivation led them to push northwards into an unoccupied buffer zone which had separated them from the Bodi ever since they crossed to the east bank of the Omo, in the south of their present territory, some time during the nineteenth century. By the late 1930s they had reached their present northern boundary, the River Mara, and further movement northwards was blocked by the Bodi. Forty years later, with crop yields falling rapidly due to a shortage of new land for rain-fed cultivation, the stage was set for the continuing crisis of the last twenty years, involving drought, famine, war, and migration (Turton, 1988).

Part II: Herd structure and dynamics: a case study

Location

We camped near three Baruba settlements (numbered 1, 2 and 3 on Figure 4), overlooking the valley of the River Welya, a headstream of the Mara, in northern Mursiland. They were within a few minutes' walk of each other, just west of the motor-track that runs from Jinka to the Omo and just past the point where the track divides, one branch going north to Hana and the other continuing to the Omo. With only three weeks to spend in the field, and no vehicle, it was not possible to contemplate a survey of a wider area, nor did it seem sensible to take up two or three valuable days by searching, on foot, for another site farther from the motor track. Several of the herd-owners of these settlements, moreover, were men with whom I had built up a relationship of confidence and trust going back over twenty years. This was important, because I would be relying on them to give me accurate information on a subject about which pastoralists are notoriously sensitive: their cattle wealth. We first camped close to Settlement 3 but moved on 3 September to slightly higher ground, with better shade, about 200 yards east of the motor track and about two miles west of the Elma. We stayed at this site, called Warano, until moving to Makki on 16 September.

Because the cattle of a settlement form a single herding unit, it was important to get the most complete information possible for at least one settlement. I chose Settlement 1 for this purpose because, with only three herd-owners, it was of a manageable size. I also collected data on herd composition and mortality for three other herd-owners, one each from Settlements 2 and 3, and one from a settlement a few kilometres away, at Goroburai. My reason for focusing on a single settlement was not to extrapolate the characteristics of its human and animal population to the Mursi as a whole, but to understand the rigours and uncertainties of the pastoral enterprise from, as far as possible, the point of view of the individual herd-owner. By 'herd-owner' I refer to a married man who has ultimate rights of disposal over a household herd, although most of the female cattle of such a herd will be allocated to the herd-owner's wife (or wives), to support herself and her children. I interviewed only herd-owners; firstly, because it is they who make decisions about herd management on a daily basis throughout the year; and, secondly, because the Welya settlements were occupied at the time of the study (i.e. before the rain-fed crop had been stored) only by men, as described in the next section.

The herd-owners of Settlement 1 and their households

Ulichagi[5]

He occupies the central position in the settlement, both physically, because his compound is between the other two, and socially, because Ulitulla and Ulikoro are related to each other through him. Ulitulla is his first cousin, and Ulikoro is his brother-in-law. All three are approximate age mates, in their late thirties, but Ulichagi's family is at a more advanced stage in its developmental cycle. He has four children between the ages of 1 and 12, and recently married a second wife, by whom he has not yet had any children. He shares his compound with an unmarried full brother, in his mid-twenties. His mother, and an illegitimate daughter of his father's brother, a member of Settlement 2, are also part of his household. At the time of the study, his two eldest sons were living with him at the settlement and acting as herd boys. His senior wife and her two youngest children, his junior wife, his mother, and his father's brother's daughter were at the bush cultivation areas in the Deholo valley, about an hour's walk away, where the storage of the rain-fed crop was in progress. So of a total of ten household members, five were resident at the settlement.

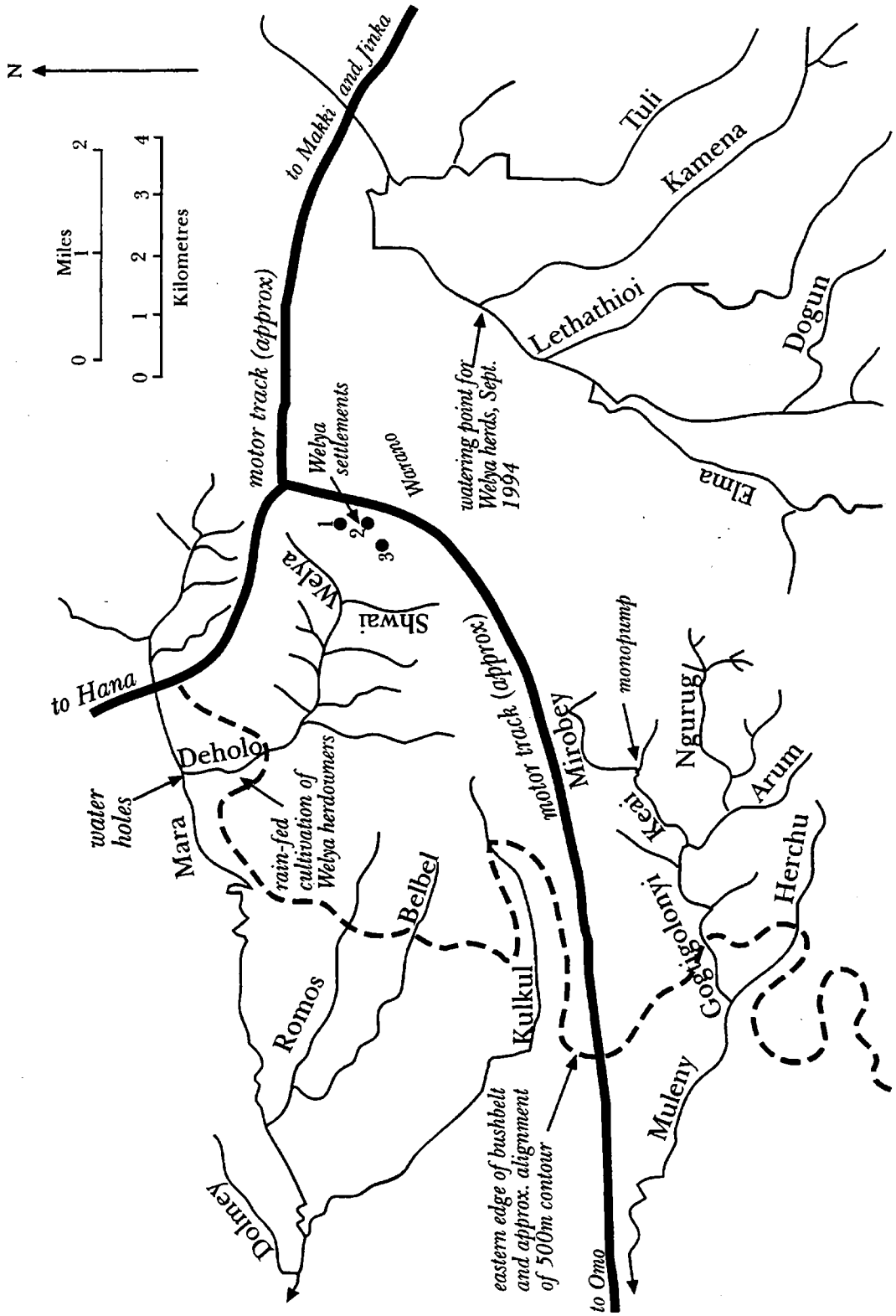

Figure 4: The study area

Ulikoro

He has one wife and three children between the ages of 1 and 5. At the time of the study, his wife and two youngest children were sleeping at the cultivation areas. With no son old enough to act as a herd boy, he had living with him in his compound the 12 year-old son of a first cousin (his mother's sister's son) whose settlement was nearby (and who is also the father of Ulichagi's second wife). Of a total of six household members (including his cousin's son), three were resident at the settlement.

Ulitulla

He has one wife and a toddler son. Also part of his household were the four orphaned children of one of his mother's brothers (and therefore first cousins of Ulichagi). The two oldest of these, a girl of about 15 and a boy of about 12, were resident at the settlement, the latter acting as herd boy. His wife and son and the two other children of his mother's brother were sleeping at the cultivation areas. Of a total of seven household members, three were resident at the settlement.

Herd size and composition

The Mursi classify cattle into four categories on the basis of sex and age (Table 3). I shall use these categories in the account which follows, because they do not have exact English equivalents. In particular, the Mursi language does not make a terminological distinction between female calves (up to one year) and heifers (1-3 years), nor between bull calves, bulls up to the age of 3, and bullocks.

The distribution of cattle among these four categories for each herd of the settlement and the ratio of cattle to household members are shown in Table 4. The average number of household members is 8, and the average number of animals in the household herd is 30. It is no surprise, given the concentration of the pastoral enterprise on milk production, to find that females, of all ages, account for well over half (62 per cent) of the settlement herd; nor that adult cows make up the single largest category (34 per cent). Ulitulla, who has the largest herd and a ratio of six animals to each family member, is regarded as wealthy, by comparison not only with the two other members of the settlement but also with neighbouring herd-owners. His own comment on the size of his herd was that he was attempting to collect enough animals to make the bridewealth payment for a second wife in the near future. This would also help to explain why he owns nearly half the total number of male animals in the settlement herd. Ulichagi, on the other hand, who has recently married for a second time and is therefore in the process of rebuilding his herd, owns exactly half the total number of adult cows in the settlement herd. This will give his herd a higher rate of (theoretical) natural increase than either of the other two. Ulikoro's relative poverty is

Table 3: Classification of cattle into four categories by sex and age

Sex	Age	Mursi term	English equivalent
Females:	1. up to 3 yrs (not given birth)	Morr (sing) Morra (plur)	Calf/Heifer
	2. 3yrs + (given birth)	Bi jone* (sing.) Bio juge (plur.)	Cow
Males:	3. Up to 3 yrs; 3 yrs+if castrated	Bungai (sing.) Bungen (plur)	Bull calf/Bull Bullock/Steer/Ox
	4. 3 yrs+, not castrated	Uli (sing.) Ulinya (plur.)	Bull

* Bi/Bio is the equivalent of the English, 'cattle'; jone = 'mother'

illustrated by the fact that the only cow of his herd that was in milk at the time of the study had been given to him by his father-in-law, a member of Settlement 2, 'so that his daughter [Ulikoro's wife] should not go hungry'. Even though the settlement includes, by Mursi standards, one wealthy and one moderately wealthy herd-owner, the overall ratio of cattle to household members for the settlement as a whole is well below the minimum needed for a purely pastoral existence in East African conditions. This is estimated by Dahl and Hjort (1976) to be around 10 cattle per person; their study of this subject remains the most exhaustive.

Milk yield

Calculations of the minimum viable herd size for a pastoral population depend, of course, on the seasonal milk yield and on the number of cows that can be expected to be in milk at any one time. Out of the 30 adult cows in the settlement herd, only 10 were in milk at the time of the study. This is rather low, compared with estimates that have been made for other groups, according to which 40-50 per cent of adult females will 'normally' be in milk at any one time. This in turn suggests a low average calving rate (the percentage of cows giving birth in one year out of the total number of adult cows in the herd) of around 50 per cent for the cows of this settlement (Dahl and Hjort, op.cit., pp. 35, 149). Cows were being milked (by the herd boys) twice a day at the time of the study, at around 6 in the morning and immediately after the herds returned from grazing at around 7 in the evening. (At wetter times of the year there may, in addition, be a milking in the mid-to-late afternoon and in the early hours of the morning.) Using a 2-litre measuring jug, we measured the amount of milk available for human consumption from each lactating cow of the settlement (i.e., after its calf had taken its share) at one morning and one evening milking. For Ulichagi's herd we took both measurements on the same day, 10 September, and the results are shown in Table 5. The average total yield per cow was 1.3 litres. Given that this was a dry time of year — there was virtually no rain in the study area throughout our stay — this is consistent with figures available for other groups of subsistence herders in east Africa (for example Dyson-Hudson, 1970, pp.95-7; Dahl and Hjort, op.cit., pp. 143-8). No figure is recorded for the evening milking of cow 4, because the herd boys had allowed its milk to be taken by its calf while the herd was out grazing (the calf was old enough to accompany the herd, rather than remain close to the settlement). Cows 5 and 6 were tulchans (*tukanya);* that is, their calves having died, surrogates made from the skin of the dead animals had to be used to persuade them to let down their milk. On the assumption that 'nomadic' (as opposed to European) milk gives around 700 kcal per litre (Dahl and Hjort, op. cit., p. 154), the total milk yield for human consumption from Ulichagi's herd on this day (8.3 litres) would have provided 5,810 kcal. According to Brown's (1971) estimate of the daily calorific requirements of a 'standard' adult male pastoralist (2,300 kcal.), this would have been enough to supply two adult males and perhaps a 12 year-old herd boy. Ulichagi's herd, then, was not providing enough milk to support, at

Table 4: Settlement 1: Herd composition and cattle per capita, September 1994

Herd-owner	Stock category 1	2	3	4	Total herd	H'hold size	Cattle per capita
Ulichagi	6(19)	15(48)	7(23)	3(10)	31	10	3.1
Ulikoro	3(19)	5(31)	7(44)	1(6)	16	6	2.6
Ulitulla	16(38)	10(24)	13(31)	3 (7)	42	7	6.0
Total	**25(28)**	**30(34)**	**27(30)**	**7(8)**	**89**	**23**	**3.86**

Note: Figures in brackets = percentage of total herd

Table 5: Milk available for human consumption, Ulichagi's herd, 10/9/94

Cows	Milk in litres Morning	Evening	Total
1	0.8	0.7	1.5
2	1.0	1.0	2.0
3	1.2	1.2	2.4
4	0.5	—	0.5
5	0.4	0.4	0.8
6	0.5	0.6	1.1
Total	**4.4**	**3.9**	**8.3**

this probably rather modest level, even the five members of his family who were sleeping in his compound at the settlement.

Only one of Ulikoro's five cows was in milk. At the evening milking on 12 September it provided 1.4 litres for human consumption and, on the following morning, 1.3 litres. Treating this as a day's supply, the cow provided 2.7 litres, or 1,890 kcal., not enough for Ulikoro, his 5 year-old son and 12 year-old herd boy, let alone the three other members of the household who were resident at the cultivation areas. Three of Ulitulla's 10 cows were in milk. At the evening milking on 9 September they provided, together, 2.1 litres for human consumption and, the next morning, 2.2 litres. As a day's supply, this was 4.3 litres, or 3,010 kcal., which was, again, insufficient to provide the daily calorific requirements of the three people (Ulitulla himself, his herd boy and the latter's older sister) who were sleeping in Ulitulla's compound.

Herd dynamics

It is obviously important to know how the pastoral enterprise of Settlement 1 is behaving over time and, in particular, to know whether the settlement herd is growing, declining, or remaining stable. This is not possible on the basis of the 'snapshot' information I have provided so far. Ideally, one would be able to compare this with equivalent information collected from the same herd-owners at several earlier and/or later points in time. I did, however, ask each herd-owner to describe what had become of all the offspring of the cows currently in his herd, and to list all his animals which had died over the past year. Table 6 shows a roughly comparable death rate of offspring for each herd in the settlement and a roughly comparable number of offspring per cow. Ulichagi's herd contains noticeably fewer of the offspring born into it than the other two. This is not due to the marginally higher death rate in his herd, but to the relatively large proportion of animals — over a quarter of all offspring — which he has sold, given away, and paid in bridewealth. Overall, exactly half the offspring of cows currently in the settlement herd remain in the herd, 35 per cent have died, and 15 per cent have been sold, given away, or paid in bridewealth.

Table 7 shows drastic losses over the past year. Comparison with Table 4 shows that Ulichagi had lost the equivalent of 65 per cent of his present herd, Ulikoro 81 per cent, and Ulitulla 24 per cent; and that deaths in the settlement herd as a whole reached nearly half its present numbers. This was indeed regarded both as an exceptionally high annual loss and one that was fully in line with the experience of neighbouring herd-owners. When asked for the

Table 6: Settlement 1: Offspring of cows currently in the herd

Herd-owner	Cows	Offspring Still in herd	Died	Sold	Gift	Bride-wealth	Total	Offspring per cow
U'chagi	15	12	13	2	2	5	34	2.2
U'koro	5	8	5		1	1	15	3.0
U'tulla	10	16	7				23	2.3
Total	**30**	**36**	**25**	**2**	**3**	**6**	**72**	**2.4**

Table 7: Settlement 1: Animal losses in each category and cause of death overall, 1993-94

	Animal category					Cause of death		
Herd-owner	**1**	**2**	**3**	**4**	**Total losses**	**Disease**	**Drought**	**Other**
Ulichagi	6	5	9	—	20	14	6	—
Ulikoro	7	3	3	—	13	11	1	1
Ulitulla	4	5	1	—	10	8	—	2
Total	**17**	**13**	**13**	**—**	**43**	**33**	**7**	**3**

cause of death, the herd-owners' most frequent answer was to name a disease or describe a symptom (which, as will be explained in Part III, amounts to much the same thing). In the case of the five animals for which I have recorded 'drought' as the cause of death, the reply was 'It was hit by the sun' (*dak susso*), or 'It was hit by thirst' (*dak huin*). Of the three animals in the 'other' category, one died a few hours after birth and two were calves which died for lack of milk, following the death of their mothers.

Although only Ulichagi had a significant number of losses which he attributed *directly* to drought, the men of this settlement and their neighbours were in no doubt that the main cause of the very high mortality of the previous year, especially among calves, had been an exceptionally severe dry season. Lacking sufficient water for their animals in the Elma Valley, otherwise their best dry-season grazing area, many Baruba people had moved their cattle northwards, in December and January, to the tsetse-infested Sala River. They had to build their settlements three or four miles from the river, to minimise the tsetse danger. Members of the Biogolokare section were to be found at that time camped on top of the steep escarpment overlooking the Mago Valley, roughly where it is crossed by the Omo-Jinka motor track. This was the nearest they dared build their settlements to the tsetse-infested Mago bush, through which the herds were taken down every day to drink from the river, with little opportunity for grazing on the way. Apart from exposing them to tsetse flies, this lengthy and arduous daily trip to and from water, at the height of the dry season, must have put considerable stress even on adult animals, making them more susceptible to trypanosomiasis and other diseases, and reducing calving rates and milk yields. (For the effect of the energy demands of travel on milk yields, see Homewood and Rogers (1984), according to whom the 'The maximum radius normally covered by pastoralist cattle in their daily trek is 8 km' (pp. 11, 14-21)). Sick animals and very young calves, furthermore, were not able to make the journey at all, so that water had to be carried back to the settlements for them from the river. This raised the serious and often insuperable problem of how to carry enough water, given a general lack of suitable containers. Many animals died as a result.

Because cattle herds are subject to natural increase, the figures shown in Table 7 do not tell us by how much, if at all, the herds of this settlement declined over the year. For this we need to make a number of assumptions, from which the figures presented in Table 8 are derived. If we first assume that the number of cows (i.e. breeding females) in the initial herd was equal to the number in the present herd, plus those which died over the year, we can calculate the calving rate which would have been necessary for natural increase to have balanced the recorded mortality. Take, for example, Ulichagi's herd. He has 15 cows in his present herd and five died over the past year. If he therefore began the year with 20 cows (Table 8, Column A), their calving rate would have had to be 100 per cent in order for the number of animals born into the herd during the year to have made up for the number lost through death (Column C). This is well above the highest average calving rates recorded for other

groups, and 40 per cent higher than the rate which Dahl and Hjort take as their 'normal' case for East African herds when, as here, old and barren animals are not excluded from the calculation (op. cit., pp. 35-7, 64). If we make the safer (but still optimistic) assumption of a 60 per cent calving rate, no more than 12 animals would have been born into Ulichagi's herd over the year (Column B), eight fewer than the number which died. Assuming further that any animals he bought or received as gifts over the year were balanced by others he sold or gave away, his initial herd (Column E) would have consisted of 39 animals: i.e. it would have equalled the number in his present herd (which we know), plus the number of deaths over the year (which we also know), minus the number of births, estimated on the assumption of a 60 per cent calving rate. On these assumptions, Ulichagi's herd declined over the year by just over 20 per cent, whereas it would have increased by 30 per cent if no animals had died. If such a rate of decline were to continue, it would take only three years for his herd to reach half its present size. If the same calculation is applied to Ulikoro's and Ulitulla's herds, the estimated decline over the year in the settlement herd as a whole comes down somewhat to the still considerable figure of 16 per cent, thanks to the very small decline in Ulitulla's herd. But it would still have needed a calving rate of 100 per cent for births to have kept pace with deaths in the settlement herd during the year.

Table 8: Settlement 1: Estimated decline in herds due to death, 1993-94

	A Cows	**B Births**	**C Deaths**	**D Present herd**	**E Initial herd**	**F Decline (%)**
Ulichagi	20	12	20	31	39	20
Ulikoro	8	5	13	16	24	33
Ulitulla	15	9	10	42	43	2
Total	**43**	**26**	**43**	**89**	**106**	**16**

Notes to Table 8

Column A: Estimated number of cows in the initial herd (= those in the present herd plus those which died over the year).

Column B: Estimated number of calves born over the year, on the assumption of a 60 per cent calving rate.

Column C: Number of deaths in the herd during the year.

Column D: Size of the herd in September 1994.

Column E: Estimated size of the herd in September 1993 (C + D — B).

Column F: E — D as a percentage of E.

Part III: Constraints on pastoral production

Disease

Mursi classification of cattle diseases and ailments

The following information was collected in general conversation and by asking different men, on different occasions, to list and describe as many cattle diseases as they could think of. Although I believe the list contains all the major diseases and ailments of cattle recognised by the Mursi, it is far from exhaustive in the information it gives about local knowledge of the diseases listed. There is much more information to be collected about, for example, the development of symptoms over time and the conditions of the internal organs after death. It is partly for this reason that I have not made a great effort to match up the Mursi classification with one based on veterinary science. As with most 'ethnomedical systems', furthermore, the Mursi classify cattle diseases by naming and describing their most salient symptoms. It follows that they may classify diseases with the same aetiology as different, and *vice versa* (McCorkle and Mathias-Munday, 1992, p. 60). I have, however, recorded the 'probable' scientific names which were suggested for several of these diseases by a team from the Soddo Regional Veterinary Laboratory (SRVL) of the Ministry of Agriculture, which, at the instigation of and with the support of Oxfam (UK and Ireland), carried out a veterinary health survey in northern and central Mursiland in May 1993 (Kassaye and Mohamed, 1993, pp. 8-9).

1. *Achuk-a-bilecho* ('yellow meat'): Main symptom: diarrhoea. Meat has yellowish appearance. Affects only calves. Occurs all the year round.

2. *Baga*: Lameness due to sores/ulcers on feet. Occurs all the year round. (SRVL: Foot and mouth disease).

3. *Dugi*: Animal becomes very thin, suffers from diarrhoea, and loses hair from the end of its tail. The meat is watery. Caused by bite of tsetse fly. Occurs all the year round. (SRVL: Chronic trypanosomiasis).

4. *Gauwello* ('shoulder'): Shoulders become stiff and painful. Animal unable to walk. Condition deteriorates rapidly after drinking. Can die within 12 hours. Occurs only in wet season, around the time of the flowering of the *bukwe* tree (*Terminalia brownii Fresen*).

5. *Gunchi*: Main symptom is diarrhoea. Highly contagious: meat not eaten by people living at cattle camps, but sent to those living at the Omo, for fear of passing infection on to other animals. Not known in Mursiland for several years, due to Government vaccination programme, but an outbreak reported among the Chai (Surma) in the 1993-94 dry season. (Rinderpest?)

6. *Hohu* ('lung'): Main symptom cough. Pink-coloured saliva. Sores on lungs. Comes sporadically (i.e. not every year) at any time of year. When an outbreak occurs, it can last 6-7 months and cause many deaths. (SRVL: Pneumonia)

7. *Hereto* ('diarrhoea'): Bloody diarrhoea. Symptoms similar to those of dysentery in humans. Occurs all the year round.

8. *Kaukau*: Skin swells and gives off a noise described as 'kash, kash', when pressed. Meat smells rotten. Some animals die within three days; others recover after six. Occurs sporadically, usually around March, but used to be more regular. No outbreak in 1994 up to September.

9. *Ke-a-sabai* ('thing of the head'): Circling behaviour. Animal will run off into the bush if not tied up. Contagious. Occurs all the year

round. Has become widespread in recent years due, it is said, to the acquisition by Bodi of infected animals in the highlands. (Heartwater? Leptospirosis?)

10. *Kuruti*: Swelling under the neck. Animal will not graze. If bled, inadvertently, from the jugular vein, swelling develops at the place from which blood is taken and the animal is likely to die quickly. Adult animals likely to recover after lengthy illness. Occurs sporadically at any time of the year. Occurred annually in the past. (SRVL: Pasteurellosis)

11. *Kinyinya*: Small biting flies which attack young calves and infest the shelters in which they sleep at the settlement. Most prevalent in August/September.

12. *Lungidai*: Smelly discharge from ear. Loss of appetite. If bled, animal will become thin and die. Otherwise likely to recover. Occurs every year. Most likely to occur in August/September, but improves after the grass is burnt (i.e. November/December). Cured by trypamidium injection. (SRVL: Acute trypanosamiasis)

13. *Momu*: Retained afterbirth.

14. *Nyambarr*: Swelling of body with sores on shoulders, back, and neck. Death most likely within five days, but recovery possible. Contagious. Carcass should be burnt, because it can infect humans if handled or eaten. Occurs sporadically, between August and December. Last remembered occurrence: 1990-91. (Anthrax?)

15. *Orana*: Abortion/still birth.

16. *Rokono*: Rapid breaths, especially when in the sun. Sores on feet, as in *baga*. Coat hair stands up. Does not give milk. Contagious but not necessarily fatal. Occurs sporadically in the dry season. Last remembered occurrence: 1989-90.

17. *Tara* ('liver'): Liver becomes very large. Animal drinks little. Diarrhoea and salivation. Death within six days. Trypamidium injection can cure it, but otherwise fatal. Occurs at any time of the year. (SRVL: Babesiosis)

18. *Thida*: Tick infestation. Worst in August/September.

19. *Ulino*: Sores cover the animal's skin, spreading from the stomach. Loss of coat hair. Running eyes. Caused by eating a certain type of caterpillar harboured by long grass. Sporadic and affects only a few cattle at a time.

Incidence

Some of the diseases listed above have a higher incidence than others. *Gunchi* has not occurred for several years, while *kuruti* and *kaukau* occur less frequently than in the past. *Nyambarr* is also relatively rare. The Mursi say that *dugi* has become progressively more widespread over the past 20 years, as the tsetse fly has spread into the wooded grassland above the 500m contour and even into the Elma Valley. They undoubtedly see the fly as the main threat to the health of their cattle, presumably because of its inexorable advance over these years. In Table 9, I have broken down by disease, for each herd-owner of Settlement 1, the losses they sustained over the past year and which they did not attribute to drought (see also Table 7). It is immediately noticeable that only two of these deaths were attributed to *dugi*, while 26 (nearly 80 per cent) were attributed to three other diseases: *hereto, ke-a-sabai*, and *tara*. One reason for this could be that *hereto*, being a symptom which can accompany or co-occur with several scientifically distinct diseases, was used to describe the condition of animals which were also suffering from trypanosomiasis (i.e. *dugi*). The same symptom may also have 'masked' cases which could as easily, and more appropriately, have been attributed to drought. Another obvious reason for the limited number of deaths attributed to *dugi* in this settlement is that in January 1994 Dr Jonathan Geddes, the SIM veterinarian from Makki, began making regular visits to the Mursi to treat their cattle, mainly with trypamidium. Although he did not limit his coverage to settlements situated along the motor track, it was undoubtedly the herd-owners of these settlements who were able to take most advantage of his help. This is one reason, if no other were needed, why the figures presented in Table 9 cannot be taken as representative of the current incidence of cattle diseases in Mursiland as a whole. The data I collected from other herd-owners during the study, however, suggest that the figures for Settlement 1 are representative of the health problems currently facing herders in this northern part of Mursiland.

Table 9: Settlement 1: Break down of animal losses by disease, 1993-94

Herd-owner	Disease/symptom							
	Dugi	**Hohu**	**Hereto**	**Ke-a-sabai**	**Orana**	**Tara**	**Other**	**Total**
U'chagi	—	1	4	2	—	7	—	14
U'koro	2	—	4	3	—	1	1*	11
U'tulla	—	—	2	—	1	3	2**	8
Total	**2**	**1**	**10**	**5**	**1**	**11**	**3**	**33**

* The only symptom described was sores over the animal's back.
** The only symptom described was a high temperature (*barbarito*).

Treatment

The standard treatment for any sick animal is to keep it tied up in the shade at or near the settlement during the day. If it is able to walk, it will be taken to water in the late afternoon and allowed to graze. Otherwise water will be brought to the settlement for it. Those suffering from *baga* or *rokono*, recovery from which is a lengthy process, may have to be abandoned if sudden flight is necessary as a result of an attack by a neighbouring group. In the case of *gauwello*, the animal is not allowed to drink for five days. On the sixth day it is given a small amount of hot water and on the seventh it is taken to the water and allowed to drink, but only moderately. On the eighth day it can drink normally. Blood letting, from the jugular vein, is also considered beneficial in the treatment of a variety of diseases (although not including *kuruti* and *lungidai*), a scientific explanation of this being that it causes 'localised stimulation of the haematogenic and immunogenic systems' (McCorkle and Mathias-Munday, op. cit., p. 65).

Only three references were made by my informants to the use of medicinal plants in the treatment of cattle diseases. One man said he had used an ointment made from the fruit of the *lomai* tree (*Ximenia americana L. Olacaeae*)[6] to treat the feet of an animal with *baga*. This is also a common treatment for wounds and ulcers in humans. Another human treatment is used in the case of retained afterbirth: the root of a plant (the name of which is known only to a few experts) is crushed, mixed in water, and given to the animal to drink. The bitter leaves of a low shrub, called *ragai* (probably *Convulvulaceae Seddera bagshauri*)[7] are crushed and used to kill maggots which hatch out from eggs laid in the wounds of animals. (*Ragai* is also the vernacular name of the tree *Tamarindus indica L.*, the leaves of which are very similar in appearance to those of the shrub.) My failure to find more examples of such treatments may have been due to insufficient time spent in seeking them out and/or to the reluctance of people to mention traditional remedies, in order to emphasise their need for outside help. But, although there is certainly more to be discovered on this topic, my impression is that the Mursi have relatively few herbal cures and remedies for animal (or indeed human) diseases and ailments. If so, this would be consistent with what has been reported for several other East African pastoral societies (Ohta, 1984, p. 84).

Diseases which affect, or threaten to affect, large numbers of animals and therefore constitute a threat to the well-being of the community as a whole may be combatted on behalf of the community by its hereditary religious leader, or priest (*komoru*). The priest is an intermediary between the community and *tumwi*, a distant and impersonal force which can nevertheless visit various misfortunes — such as drought, war, and human and animal epidemics — on human beings as a result of their failure to live up to traditional values and norms of behaviour. Every year the priest holds a ceremony, called *bio lama*, which is specifically

intended to ensure the health and fertility of cattle. All the herds of the area are brought to the ceremony to be sprinkled by the priest with a mixture of water, clay, and the blood of a sacrificial goat. He may also be called upon to perform a similar ritual at other times if a particular disease appears to be reaching epidemic proportions. The following diseases were mentioned as ones for which the priest would be expected to perform such a ritual: *dugi, hohu, kaukau, ke-a-sabai* and *kuruti*.

As will be explained in the next section, the Mursi have virtually no access to the government veterinary service, but they have been able to obtain trypanocidal drugs on the black market for many years. They call the drugs *ma-biony* ('cattle water'), and distinguish between *ma-goloiny* ('red water') and *ma-kora* ('black water'). I take the former to be ethedium bromide or novidium, which comes in the form of a red tablet, and the latter to be trypamidium, which comes in the form of a purple-coloured powder. In 1983 I was told that it was possible to buy a tablet of ethedium in Berka for ETB 2;[8] although intended as a single dose, this would be used to treat at least four animals. If only one animal was to be treated, a small piece of the tablet would be broken off and dissolved in water. (Only sick animals were treated.) Also in 1983 it was possible to buy a sachet of trypamidium (which was regarded as much more effective than ethedium) in Hana for ETB 10. A syringe cost around ETB 9 in Jinka and a needle ETB 3. The Ministry of Agriculture veterinarian at Hana was then charging ETB 0.80 to treat an animal with trypamidium, but it was too far for the Mursi to take their animals. In 1992 I was told by Dr Mohamed Aliye, then leader of the Animal and Fisheries Resources Team in Jinka, that the black-market price for ethedium in Jinka was ETB 5-7 per tablet, whereas the Ministry of Agriculture was charging ETB 0.90 or 0.95 and ETB 1.00 for a trypamidium injection. Since then, the black-market price of ethedium paid by the Mursi in Berka and Tolta (a highland village north of Berka) has reached ETB 10, and one tablet may be used to treat as many as ten animals. The Mursi find it more difficult, if not impossible, to obtain black-market supplies of trypamidium.

Access to government veterinary services

Mursiland is part of the Sala-Mago (formerly Mursi-Bodi) *wareda*, which is administered from Hana, in northern Bodiland (Figure 3). Until 1991 the *wareda* was part of the Hamar-Baco-Geleb *Awraja* (administered from Jinka) of Gamo Gofa Province (administered from Arba Minch). With the re-drawing of administrative boundaries after the fall of the Mengistu government in 1991, it is now part of the South Omo Zone, also administered from Jinka, of the Southern Peoples' Administrative Region. The Mursi are divided by the administration into three local groups: Hailu Wuha (the Amharic name for the River Mara) in the north, and Dara and Bongoso in the south. Hailu Wuha covers the Baruba and Mugjo *buranyoga*, Dara the Biogolokare and Ariholi *buranyoga*, and Bongoso (the locative form of Bongo, an Omo cultivation site south of the Dara range) the Gongulobibi *buran*.

Hana is 112 km by road from Jinka and 42 km from the Omo/Hana fork (Figure 4). The road from Jinka, although recently improved, is still difficult, even for four-wheel drive vehicles, and is quickly made impassable by rain over the Mago Valley. Partly for this reason, Hana has always been considered a 'remote' posting by government staff in Jinka. Even though it is situated well inside Bodi territory, it tends to be identified with the Mursi in the minds of those in Jinka who have never been there. If, for example, an official says he is going to, or has come from, 'Mursi', he often means Hana. This is presumably because the former name of the *wareda* was 'Mursi-Bodi' rather than 'Bodi-Mursi', and this in turn was presumably because the Mursi are more numerous than the Bodi and better known in Jinka. It would have made more sense, administratively, to have located the *wareda* capital on the River Mara, which forms the Mursi-Bodi boundary, but the Hana provided a more plentiful and reliable water supply.

The Ministry of Agriculture has an Animal and Fisheries Resources Team of four at Hana, led by an animal-health assistant, Ato Tekle Baharu, whom I visited on 16 September. A chart on his office wall listed, in descending order of seriousness, the main diseases and conditions affecting livestock in the *wareda*:

- Trypanosomiasis
- Ectoparasites
- Retained afterbirth
- Cowdriosis (Heartwater)
- Leptospirosis
- Contagious bovine pleuro-pneumonia
- Streptrotricosis

- Dermato mycosis (ring worm)
- Contagious caprine pleuro-pneumonia
- Indoparasites

Because of transport difficulties (at the time of our visit there was not a single working vehicle at Hana), no veterinary service is provided for the Mursi, and all the drugs allocated to the *wareda* by the Ministry of Agriculture are used for Bodi cattle only. Mursi cattle had, however, been inoculated against rinderpest within the last year, as part of the national rinderpest-eradication campaign, funded by the European Union. (This must have been a second or repeat vaccination, because Dr Mohamed Aliye had told me in 1992 that Mursi cattle, apart from those in the south of the country which were inaccessible because of transport difficulties, had already received one anti-rinderpest vaccination.) Kassaye and Mohamed also report that 'no vaccination or treatment services were given [to Mursi cattle] during the last five years except vaccinations against rinderpest' (op. cit., p. 11).

There is a weekly market at Hana, to which traders from Maji bring supplies of ethedium and samarin (the British equivalent of trypamidium, which is a French drug), while trypamidium itself is available in Tolta, a highland village to the north of Berka. Ato Tekle said that the people in the Hana area would use one tablet of ethedium to treat between five and ten animals and that they would even wash out an empty trypamidium sachet and use the water to inject an animal. The veterinary service charged ETB 3.60 for a 10 ml dose of trypamidium.

On 21 September I met the Chief Veterinarian in Jinka. He told me that he had no veterinary drugs at all and that the reason for this was that his office now came under the Coffee and Tea Development Board, not the Ministry of Agriculture. This appeared to be peculiar to the South Omo Zone. The veterinarians at Hana, Weyto, and Kuras (on the Omo just north of Lake Turkana) came under the Ministry of Agriculture and therefore had some supplies of drugs. Because of this new administrative arrangement, there is little if any contact and collaboration between the veterinarians in Jinka, the zonal capital, and those working in such outlying areas as Hana.

The SIM animal health programme

In 1989 the Society of International Missionaries (SIM) signed an agreement with the Ethiopian Government which allowed them to establish a base at Makki from which to provide medical, agricultural, and educational help for the Mursi. Gerald Carlson, an agriculturalist, and his wife Maija, a nurse, were the SIM pioneers at Makki. Having made a road (a 20 km spur leaving the Jinka-Omo road just before it reaches the Mago Bridge) and built a house and store, they started a daily clinic and a demonstration plot for various fruit and fodder trees, crops, and vegetables. The Mursi put great pressure on the Carlsons to help them solve the tsetse problem at Makki, which was making it impossible for them to keep cattle there. SIM accordingly instigated a survey of the Upper Mago Valley by the National Tsetse and Trypanosomiasis Investigation and Control Centre for Ethiopia, which reported that the challenge was too high to make control measures practical or desirable.

In 1992 the Carlsons were joined at Makki by Jonathan and Barbara Geddes and their two children. By this time the Mursi had given up the attempt to keep cattle in the Mago Valley, and the population at Makki had dropped to about 150. Having trained as a vet in his native Australia, Geddes was keen to get involved in animal health and pastoral development activities with the Mursi. In January 1994, with the approval of the local office of the Ministry of Agriculture in Hana, he began treating cattle in northern Mursiland, mainly with trypamidium injections. He also treated some animals for internal parasites, although liver flukes, being associated with marshy ground, proved not to be a serious problem for Mursi cattle. Geddes took this action directly in response to renewed and insistent demands for help from Mursi who were having to water their animals in the Sala and Mago rivers because of the severe shortage of water that year in the Elma Valley. By September 1994 he had treated 1,814 animals for trypanosomiasis and another 440 for internal parasites.

Geddes visited the Welya settlements twice during our stay. On 9 September he arrived at about 10 am, with two helpers (one a young Mursi man from Makki) and camped outside Settlement 2. Although most of the cattle had been taken out to graze by then, he treated 60 animals with a 1 per cent solution of trypamidium, each 1 g sachet being dissolved in 100 ml of boiled water. The correct dosage varied, of course, with the weight of the animal, and to estimate this he used a knotted girth rope.

Owners were charged at the rate of ETB 0.30 per millilitre, corresponding to ETB 30 per sachet, the price Geddes was then paying for trypamidium in Addis Ababa. The charge for an average-size animal was ETB 3 (i.e. a 10ml dose) and ETB 4 for a large ox. (On his next visit he had to increase the price for a large animal to ETB 5, because of an increase in the price charged by his supplier.) In the afternoon he moved to Dirikoro, about 20km to the south-west, and treated a further 30 cattle there. He slept at Dirikoro and returned to Makki the next day. On 14 September he arrived at Welya after dark and throughout the next day treated cattle from the three Welya settlements and from the surrounding area. He treated more cattle on the morning of the 16th, making a total for this visit of 216.

Observing these two visits of Geddes left one in no doubt of the very high level of demand among Mursi herd-owners for the service he was providing. On each occasion, his arrival was a major and eagerly awaited event. One man, who happened to be at Welya on the evening of 14 September, set off for his settlement (at Hudungul, about 5km to the west) as soon as Geddes arrived and brought his entire herd back, overnight. Other cattle began arriving at first light and some waited all day without receiving treatment. Although there would presumably have been even more demand if the treatment had been free, there was clearly no shortage of owners who were prepared to pay the amount being charged. This is worth noting, because the SRVL team had reported, less than 18 months earlier, that the Mursi were very reluctant to pay anything for treatment (Kassaye and Mohamed, op. cit., pp. 11-12). It is possible that this change has been brought about by Geddes's visits. It is also possible that residents at the various Baruba settlements situated along, or close to, the Jinka-Omo motor track are better supplied with cash than those living farther south, because they come into fairly regular contact with tourists visiting the Mago and Omo National Parks. One of the main objectives of the tourists is to take photographs of Mursi, especially women and girls wearing lip plates. The tourists can usually be persuaded to pay a few Birr for the right to take these photographs, although they often seem to resent being asked. (Not long before our visit, a film crew from a Japanese television company had paid one resident at Settlement 3 ETB 50 for the right to film a cow being milked with the aid of a tulchan.)

The Mursi (especially those in the northern part of the country) would have lost many more cattle over the past year had it not been for the help given by Geddes. Several people remarked that, but for 'Yonatan', their herds would have been 'finished' during the 1993-94 dry season. It was obvious, too, that they responded well to Geddes on a personal level, not least because he has acquired a good working knowledge of the language. They were not, however, without some criticisms. They complained that they did not know when he would be arriving, that his visits were too brief, and that he did not bring enough trypamidium. Because they did not know exactly when he would next appear, herd-owners were not able to plan in advance to have their animals available for treatment. And because he normally stayed only one night, many found it impossible, after receiving word of his arrival, to get their animals to the treatment point before he had returned to Makki. It was also said that he often had to turn away animals that *were* brought for treatment, even though their owners had the money to pay for it, because he had run out of trypamidium.

I discussed these criticisms with Geddes, who pointed out (a) that SIM did not have, and would never have, the resources needed to provide a comprehensive veterinary service for the Mursi; and (b) that, even if it did, this would not be the right way to proceed. His hope was that the veterinarians at Hana would be given the support they needed — improved roads, more vehicles, money to establish one or more veterinary posts — to provide a basic service to the Mursi, while he gave back-up clinical support where necessary and otherwise adopted an educational and research role. He was also worried about the risk of resistance developing to trypamidium, as it has elsewhere in Ethiopia, and it was for this reason that he deliberately limited the amount of the drug he took with him on each trip. He and his family were due to go on a year's home leave in December 1994; although efforts were being made by SIM to find a veterinarian to replace him, it was not at all certain that these would succeed. Now that the high level of demand among the Mursi for veterinary treatment — and their willingness to pay for it — had been established, this would be the ideal time for the Hana veterinarians to extend their service to Mursiland, if a way could be found to solve their transport problems.

Drought

'Tracking' a variable environment

Earlier, I described the annual transhumance movements which the Mursi have adopted in order to combine two types of cultivation with cattle herding. In the case of cultivation, these movements are fairly predictable from one year to the next, in terms of both timing and direction. As the Omo flood recedes in September and October, people must return to the same river-bank sites to plant their flood crop and they must remain there, protecting the growing sorghum from animals and birds, and harvesting and storing the crop, until January and February. They must prepare their rain-fed cultivation areas along the Omo's westward-flowing tributaries in February and March, to be ready to plant as soon as the ground has been sufficiently moistened by the March/April rain, and they must watch over the crop until they have harvested and stored it in August or September. Cattle movements, on the other hand, are far less predictable. The main factor which determines them (because it governs the availability of water and grazing) is rainfall, which is highly variable as to timing and location. Herd-owners therefore have to be alert to changing conditions in the rangeland on a daily basis and be ready to move their animals at fairly short notice in order to match the available water and grazing to animal numbers in a particular place. In the jargon of the so-called 'new thinking' among range ecologists, this is the 'tracking', or 'opportunistic management strategy', which is required in a 'dynamic' or 'non-equilibrial' ecosystem — one in which a population is not in long-term balance with other components of the system (Behnke and Scoones, 1993; Scoones, 1994, p.9; Ellis, 1994, p. 38). It follows that my earlier outline of cattle movements was highly simplified and schematic. Although accurate at a very general level, it masks the unpredictability and uncertainties of real life.

At the time of the study, the people and cattle of the Welya settlements were drinking from a natural 'tank' in part of the former bed of the Elma, about two miles' walk to the south-east (Figure 4). The cattle would leave the settlements between eight and nine every morning, heading east, and reach the water about three hours later. After drinking, they would spend the rest of the day grazing west of the Elma, returning to the settlement between six and seven in the evening. They were not being taken east of the Elma, because the grass there (particularly a species called *tawali* in Mursi (*Panicum maximum Jacq.*), which can grow to a height of six or seven feet) had grown very tall over the wet season and was both unpalatable and difficult to graze. (Later on this would be burnt and then, with the arrival of the *loru* rains in October and November, new shoots would grow up to provide ideal grazing.) Towards the end of our stay (during which there was virtually no rain), the herd-owners of the three Welya settlements were beginning to express concern that the watering point would soon be inadequate for the number of cattle using it. Some men went to look for alternative water points up and down the Elma, but with little success. One man reported on 14 September, for example, that there was standing water in the bed of the Tuli, a tributary of the Elma, but only enough for three or four days' supply for a herd of around 30.

A growing water shortage

From the first day of the study, it was obvious that drought was seen by the local herd-owners as no less pressing a problem than disease. This was partly, of course, because they had suffered so many losses over the past dry season, as a result of having to take their cattle to the Sala and Mago rivers to find water. But it was also because they saw this as an extreme symptom of a long-term process. They told me that, whereas 20 years ago there were several places in the Elma valley where water could be obtained throughout the year, today there are only two: in the Shangaro river, which drains the north-western slopes of Mt Dara, and in the bed of the Lethathioi, which joins the Elma farther downstream (Figures 4 and 5). In neither place is the supply sufficient to support more than a handful of cattle at the height of the dry season. The explanation given for this was reduced rainfall, an observation which is in line with the findings of meteorologists that there has been a significant reduction in rainfall over the 'Sudano Sahelian' belt during the past 30 years (Hulme, 1992, cited in Benson and Clay, 1994, p. 24; Scoones, op. cit., p. 12).

A reduction in *local* rainfall, however, is not the only factor that needs to be taken into account in order to explain increasingly dry conditions in Mursiland over the past 20 years. Another, and presumably more important, factor must have been the continuing fall in the level of Lake Turkana, and thus in the ground-water level throughout the Omo Basin, caused by a reduction in rainfall over the highland

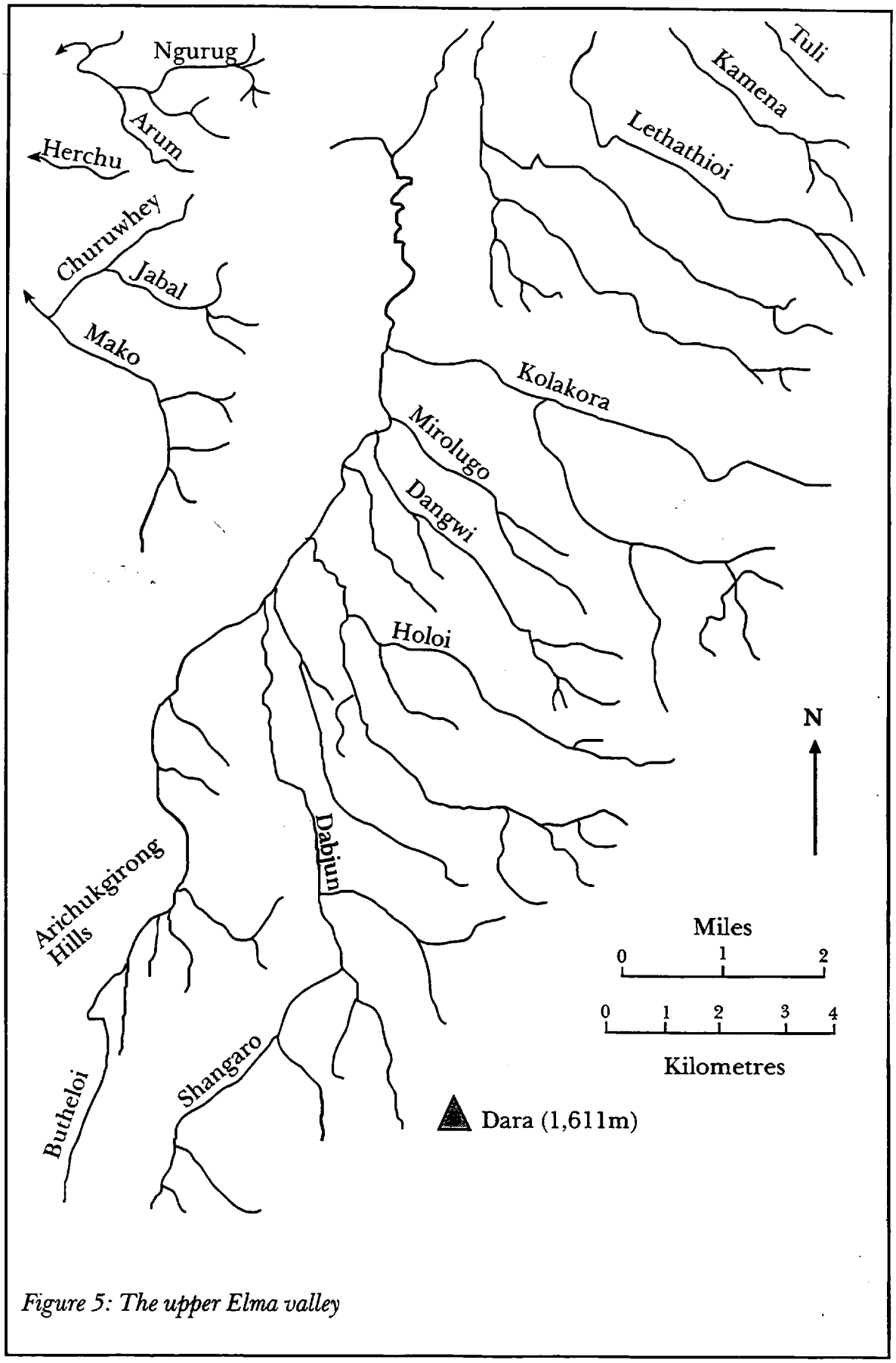

Figure 5: The upper Elma valley

catchment area of the River Omo. This drying out has been going on for several thousand years. According to Butzer (op. cit., p. 15) and Nyamweru (1989), around 10,000 years ago the lake stood at 80m. above its present level and there was overflow from the Turkana Basin into the Nile basin. Around 7,500 years ago the lake had shrunk to roughly its present size, but there were subsequent rises and falls. As recently as 1,500 BC it stood at over 70m above its present level, so that its shore must have been roughly in line with the 500m contour (Figure 3). Butzer gives the present level as 375m and Nyamweru uses the same figure, with the qualification 'as of the mid-1970s' (p. 179). Over the past 3,000 years, then, the lake has been 'dropping rapidly, in successive stages, below the threshold of the probable Nile overflow. Concomitantly, the lower Omo River cut down its bed by as much as 52 meters before it could begin to aggrade its modern flood plain and delta' (Butzer, op. cit., p. 15). Considering this timescale, one realises the extent of the drying out that has taken place, and has continued to take place up to the present, in the lower Omo Basin. There is evidence that it was possible to sustain a sedentary agricultural lifestyle in the Elma Valley as recently as 200 years ago. On the lower, northern slopes of the Arichukgirong Hills there are the remains of the bases of several circular stone houses. The Mursi say that this was a settlement of agriculturalists and that it was abandoned following their own arrival in the area, which was not before 200 years ago.

According to the Mursi, the trend towards drier conditions has continued over the past 20 years. The people I spoke to in September 1994 were also clear that there had been a dramatic growth in cattle numbers over the same period, and that this had put increased pressure on the water supplies that *were* available. They attributed this growth to a lowering in the incidence of epidemic diseases and to a significant, though less dramatic, increase in the human population. (It was taken for granted that increased cattle numbers were the result and not the cause of increased human numbers.) In 1970 I estimated that the Mursi had around 5,000 cattle, or one per head of human population. In 1992 the Hana veterinary office's figure for Mursi cattle numbers, based on rinderpest vaccinations carried out that year, was 12,000, divided between 8,000 in the north (Hailu Wuha) and 4,000 in the south (Dara/Bongoso).[9] That was probably an underestimate, since the campaign did not reach all Mursi cattle. The figure given to me by Ato Tekle on 16 September, based on the most recent rinderpest vaccinations, was 20,500, divided between 11,000 for Hailu Wuha and 9,500 for Dara/Bongoso. If this figure and my estimate for 1970 are both correct, the cattle population has quadrupled over the past 20 years. This is difficult to believe, since it would have required an average annual growth rate of 10 per cent, which is the maximum theoretically possible, on the assumption that there are no sterile cows and that all cows produce one calf per year (Dahl and Hjort, 1976, p. 61). A much more believable growth rate is 5 per cent, which would have resulted in a doubling of numbers in 20 years. Although the figures returned by the rinderpest campaign team may not have been entirely accurate, it is very likely that my 1970 estimate was much too low.

Because of reduced rainfall, a lowered water table, and increased cattle numbers, the Elma Valley, once the dry-season grazing area *par excellence* of the Mursi, can no longer support the majority of their cattle at the driest time of the year. During December and January, some Baruba cattle will be watered in the bed of the Lethathioi river, and a few from the Mugjo, Biogolokare, Ariholi, and Gongulobibi *buranyoga* will be watered in the Shangaro Valley. Most Baruba cattle, however, will drink from the Sala river, where there is grazing, but a high tsetse challenge. During the 1993-94 dry season some people built their settlements in the Elma Valley, but took their cattle to Sala to drink. Because of the distance and the heat, they would graze the cattle at night, reaching the Sala in the early morning. After spending much of the day under shade trees at Sala, the cattle would return to the Elma in the late afternoon. Some Baruba cattle will be watered at the height of the dry season from water holes dug in the bed of the Mara (Figure 4). Some will go to the Omo, where there is both a high tsetse challenge and virtually no grazing. During the 1993-94 dry season, cattle were taken to the east bank of the Omo to find grazing. Some Biogolokare cattle will drink at Ilithey and Dulu on the Omo (south of the Dungwi River, Figure 3), and it was Biogolokare cattle which were taken, *in extremis*, to drink from the Mago River during the last dry season. Ariholi cattle also use the Omo during the dry season, drinking at Kurum and grazing on the south-western slopes of the Dara range.

These 'opportunistic' seasonal movements have resulted in one part of the range utilised by the Mursi — the area between the Elma and the eastern edge of the bushbelt — coming under particularly heavy grazing pressure, not only in the wet season but also in the dry season. The Elma Valley, on the other hand, is not used in the wet season, because the grass gets so far ahead of the cattle that they cannot effectively graze it; it is under-used in the dry season, even though it is then relatively free from tsetse, because of the shortage of water. The vegetation in the study area, especially between the Elma and the settlements, certainly showed evidence of a high concentration of cattle. In places the grass had been driven out altogether by a low stand of *ragai*, which was of no use at all as grazing. The people attributed this not to over-grazing, but to trampling. They explained that, here on the watershed between the Elma and the Omo's westward-flowing tributaries, in contrast to the Elma Valley itself, the top soil is thin and the roots of the grass do not reach down very far. It is therefore easily killed when repeatedly trampled.

The same picture is to be seen farther west at Goroburai, in the vicinity of the hand-dug well which was installed by the Jinka Catholic Church in 1989. Although it was providing no water at the time of our visit and had been yielding very little over the past 12 months, the availability of permanent water at this point undoubtedly encouraged a concentration of settlements in the Goroburai area over the past few years. With a (theoretical) capacity of 6,000 litres per day, drawn by a hand-operated 'monopump', it could not have been used to water more than about 200 adult cattle daily (assuming a mean requirement of between 20 and 30 litres per day per head). In fact it was used by those who built their settlements in the Goroburai area for human consumption and for calves and small stock, while adult cattle were watered as far afield as the Elma and Mara. These settlements were occupied, if not all the year round, then at least for longer into the dry season than would have been possible if a permanent water supply had not been available. When the yield from the well fell during 1993-94, water could be obtained from it only at night or in the early morning. People would spend all day at the well and even sleep there for two successive nights in order to collect enough water for their calves and sick animals. The concentration of permanent — or near-permanent — settlements which the well encouraged certainly subjected the grassland in this area (relatively fragile, compared with the Elma Valley) to increased grazing and trampling pressure.

Conflicts over land-rights

Common property

As for many other African herders, the most fundamental threat to Mursi pastoral production comes neither from disease nor from drought, but from their lack of secure rights to vital territorial resources (Scoones et al. 1993). Land-use conflicts in Africa are not, of course, confined to pastoral areas; but the land rights of pastoralists are peculiarly vulnerable. This is because they are overwhelmingly held in common and are therefore liable to be legally classified as 'public'. They are not, however, equivalent to the communal land rights of peasant cultivators.

> For agricultural communities ... communal lands ... form a reserve of land for future cultivation or supplement to agricultural practices. This is not the case with pastoral societies. Communal lands, in the form of pasture lands, are the basis for pastoral production. These lands are used for the major productive activity, i.e. grazing of livestock. (Tenga, 1992, p. 13)

Among the Mursi, access to pasture land and the water points found within it is controlled by local groups, that is, *buranyoga*.

The territorial foci of *buranyoga* are invariably particular rivers and tributary streams. Thus the constituent *buranyoga* of the Dola *buran*, although now all bearing names which are not geographically based, were formerly identified by reference to a particular Omo tributary, along which they cultivated and in which they watered their cattle (namely the Mara, Mako, and Darthum rivers respectively). Members of what is now the Biogolokare *buran* were formerly known as 'the Dola of Darthum', and so on. A corresponding north-south division is followed for grazing land in the Elma Valley, all of which is regarded as Dola country. The Sala river and lower Elma Valley, north of and including the Dogun, are collectively owned by the Baruba *buran*, while the area between the Holoi and Kolakora rivers is Mugjo country. The upper Elma Valley, including the Dabjun, Shangoro, and Butheloi rivers, belongs to the

Biogolokare *buran*, although the Shangoro valley is regularly used by members of the Ariholi and Gongulobibi *buranyoga* (Figures 4 and 5). Although each Dola *buran* is associated with a particular area of the Elma Valley within which its members have 'primary user rights' (Potkanski, 1994), members of other *buranyoga*, including non-Dola ones, will be granted temporary rights in the same area in times of special need or emergency. This is a form of management which is highly cost-effective in contexts where people are critically dependent on unpredictable natural resources, especially rainfall (Tenga, op. cit., pp. 10-11, Runge 1986; Lane and Moorhead 1994a, p. 121).

National Park development

The main attack on pastoral land rights in Africa has focused on dry-season grazing areas which have been taken over by agriculturalists or incorporated into national parks. As Lane and Moorhead point out:

> This removes from herders' control the resources they need to sustain production from marginal resources at other times of the year. Herders can make efficient use of these more marginal resources only because they have access to more humid areas in dry periods. *The loss of access to key pastures in wetter areas, which allow herds to survive the dry season, will put the entire pastoral system in jeopardy.* (1994b, p. 21, emphasis added)

For the Mursi, it is the plans of the Ethiopian Wildlife Conservation Organisation (EWCO) for the development of the Omo and Mago National Parks which constitute the chief threat to these 'key pastures in wetter areas'. The boundaries of these parks, as they have been described since at least 1970 (they have not yet been gazetted), enclose between them the best agricultural and pastoral resources of the Mursi: flood-retreat land on both banks of the Omo and dry-season grazing land in the Elma Valley (Figure 6). Given the EWCO's 'preservationist' approach to wildlife conservation (an approach which sees local people as the enemies of conservation and which owes more to European myths about 'wild' Africa than it does to African realities), the Mursi will become illegal 'squatters' in their own territory, if and when these boundaries are legally established. The area between the two parks is described as a 'Wildlife Reserve', that is, an area where 'controlled settlement and other human activity *may* be allowed, subject to the special consent of the Minister, and *may* be phased out as required' (Ethiopian Wildlife Conservation Organisation (EWCO), 1989, quoted by Sutcliffe, 1992, p. 83). It is obvious that those who demarcated these boundaries not only had no understanding of the human ecology of the area (Turton, 1987), but did not consider such an understanding relevant to their conservation objectives.

In a report submitted to the Wildlife Conservation Department (as it was then called) in 1978, J. Stephenson and A. Mizuno recommended the merging of the two parks into a 'Greater' Omo/Mago National Park, and the resettling of the Mursi on the grounds that

> The Omo and Mago will lose their value as national parks if vested human interests are permitted to exist between them. For one thing, ... the wild animals ... will interfere with the rights of the people ... and ... the people will interfere ... with the wildlife ... (1978, p. 41).

It is not stated what kind of 'human interference' with wildlife would be avoided by resettling the Mursi. There are, presumably, two possibilities: that they might kill them directly or that they might be in competition with them for scarce resources. It is true that the Mursi have a pragmatic attitude towards nature: they would share the view that Wordsworth sadly attributed to the majority of his contemporaries: that 'A rich meadow, with fat cattle grazing upon it ... is worth all the Alps and Pyrenees in their utmost grandeur' (1835, p. 151, quoted by Thomas, 1984, p. 257). But the corollary of this is that they do not kill animals, any more than they climb mountains, merely 'because they are there'. The main use they make of them is as a source of food at times of severe hunger, the main species killed for this purpose being the buffalo. They also kill elephants for their ivory, which can be used (as it has for over 100 years in this area) to buy rifles and cattle from highland traders. In short, the Mursi kill wild animals to obtain economically useful products, but otherwise their disposition is, as Evans-Pritchard wrote of the Nuer, 'to live and let live' (1956, p. 267).

As for competition between domestic livestock and wildlife for grazing and water, there seems to be more scope for coexistence between wild and domestic animals under a subsistence

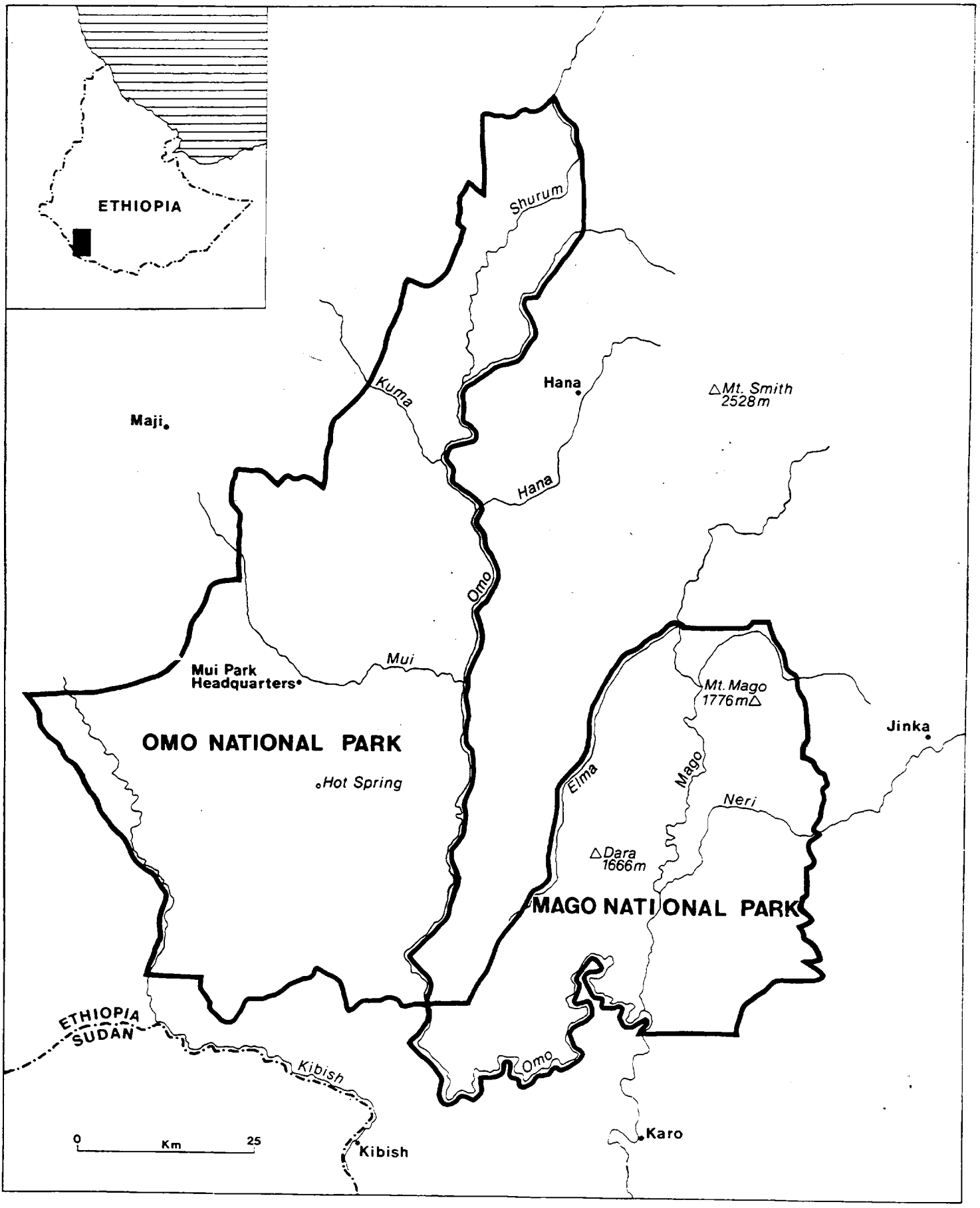

Figure 6: The Mago and Omo National Parks

herding regime than under commercial ranching or sedentary agriculture: subsistence herders are mobile, do not monopolise water points, and are relatively sparsely settled.

> It is the exception rather than the rule for East African pastoralists to exclude wildlife from key resources. Most commonly, their settlements are sited so that stock travel to and away from point resources of water or minerals, and thus allow time sharing. This is one of the key factors determining the relatively high wildlife:cattle ratios in most East African pastoralist areas. (Homewood and Rodgers, 1991, pp. 191-2)

Stephenson's and Mizuno's main concern is with the *protection* of wild animals in an environment which they describe (in the language of the tourist brochure rather than that of ecological science) as 'the country's last unspoilt wilderness' (p. 1), which has 'retained its primeval character from ages past' (p. 2). The political and institutional usefulness of the wilderness myth is that it implies (a) that there are very few people currently living in and/or using an area, and (b) that those who *are* living in and/or using it are a threat to its wilderness character. Almost all Stephenson's and Mizuno's recommendations, therefore, concern the need for technical, administrative, and infrastructural improvements — more roads, buildings, vehicles, game guards, and guard posts — which will enable the wildlife authorities to carry out their protective functions more effectively. Once the local inhabitants have been resettled outside the enlarged park boundaries, the 'integrity' of the boundaries 'must be rigidly preserved' (p. 49). It would be difficult to find a set of recommendations which were at once more unrealistic (in their expectations of what could be achieved by the policing of national park boundaries in this area) and more self-defeating (in their potential for stirring up the bitter opposition and animosity of local people to the conservation objectives of the government).

A more realistic and enlightened proposal for the development of the Omo and Mago parks is presented by Sutcliffe (op. cit.), who criticises the 'current wildlife conservation categories' (such as 'national parks' and 'wildlife reserves') of the EWCO, because of their 'lack of consideration of the basic needs of the local population' (p. 86). His proposal would divide the area inhabited by the Mursi into three 'categories of conservation management' (pp. 87-91): the Omo and Mago National Parks; the 'Mago Resource Reserve', where 'relatively low intensity human land uses' would be allowed to continue; and the 'Omo River Anthropological Reserve', where 'the subsistence economy of the indigenous population' would be maintained. He proposes new boundaries for the Mago and Omo Parks, to take account of existing human occupation and use, which would significantly reduce their size.. He also recommends that 'planning and demarcation of the new land use zones should ... be negotiated with the peoples' and that 'sharing of revenue from visitors to the area should also be catered for'. These proposals are a notable advance on Stephenson's and Mizono's, for three reasons: they show a greater understanding of local subsistence systems; they include a number of measures specifically designed to protect the interests of the local population; and they recognise the need to ensure that local people gain tangible benefits from 'conservation development'. Unfortunately, however, they do not go far enough. In particular they share two fundamental assumptions with earlier approaches: that it is *only* the needs — and the 'basic needs' at that, meaning, presumably, minimum subsistence needs — of local people, and not their *rights*, that have to be taken into account; and that natural-resource management is an activity that, by definition, can be adequately managed only 'from above'.

It is presumably because he does not question these assumptions that Sutcliffe is led, from the best of motives, to make the suggestion that an 'Anthropological Reserve' be established along both banks of the Omo. There are a number of problems with this proposal. Firstly, such an area could not possibly support the 'subsistence economy of the indigenous population'. Secondly, the proposal ignores the people who would, in effect, be confined to this corridor of land along the Omo, and their rights and aspirations to improved living conditions, quality of life, and economic security. Thirdly, it would therefore create exactly the kind of local opposition to the conservation plans of the EWCO that would ensure their ultimate failure. And, finally, it would be a short step from here to see the Mursi as no more than an aesthetic enhancement of the tourist's 'national park experience'.

The Southern Ethiopia Wildlife Conservation Project

By far the most ambitious and costly plans to date for developing the Omo and Mago Parks are set out in the report of a feasibility study undertaken for the Southern Ethiopia Wildlife Conservation Project (SEWCP). This is a five-year project, focusing on the Nechiser (Arba Minch), Mago, and Omo National Parks, to be financed by the European Development Fund to the extent of approximately ECU 16 million. A consultancy team, consisting of a wildlife biologist, civil engineer, and economist, made helicopter and ground visits to the Mago and Omo between 17 and 23 March 1993. In their final report (Agriconsulting, 1993), they note that 'It is almost certainly in the socio-cultural area that the greatest long term threats to project sustainability lie' (p. 60). What they mean by this is that, without the co-operation and good will of the local people, the project will not succeed. They therefore propose to 'increase the tangible economic benefits that rural people get from wildlife conservation' (p. 5) by, among other things,

> • fostering sustainable uses of natural resources contributing to community welfare through imaginative protected area zoning policies. In this way certain activities will be permitted in certain zones at certain times
>
> • introducing revenue sharing with rural communities living adjoining the National Parks
>
> • giving priority to local people in opportunities for employment both with EWCO and with tourist operators and contractors active in the Project areas. (p.61)

The recognition that the success of the project depends on the attitude towards it of the local people (rather than on its infrastructural and policing capacity) is greatly to be welcomed. Unfortunately, it is clear from the content of the report that it is firmly based, like the documents discussed earlier, on 'top-down' and 'preservationist' principles. For, despite their emphasis on the importance of the 'socio-cultural area', the authors go into detail only about the technical and infrastructural arrangements required by the project, and have nothing to say about the knowledge, attitudes, and resource-management skills of the local population. Indeed, the report contains no evidence that any local people were informed, let alone consulted, about the project during the six-day field visit made by the study team to the Omo and Mago Parks. One has to conclude that the specification of relevant 'socio-cultural' factors was considered irrelevant at the feasibility stage of the project (unlike the much easier and more straightforward specification of roads, bridges, and buildings). The report reveals a disturbing willingness to spend very considerable amounts of foreign aid on a complex and far-reaching environmental project, apparently in full recognition of the crucial importance of 'the socio-cultural area ... to project sustainability' and yet without taking any notice of the human ecology of the area, nor of the knowledge, capacities, and rights of the local people.

Following the feasibility study, it was decided to initiate a two-year 'preliminary phase' of the project, the aims and objectives of which are set out in a document dated April 1994. This describes a number of urgent objectives for the preliminary phase, including 'the early gazettement of the priority protected areas' and various steps to strengthen the legal, institutional, and infrastructural capacities of the EWCO (pp. 6-9). It is proposed to prepare (apparently without any meaningful involvement of the local people) 'a comprehensive and coherent land and resource use plan'

> ... to address the very serious environmental degradation currently taking place as a result of the indiscriminate build-up of livestock herds and grazing patterns [sic], combined with uncontrolled exploitation of the natural resources of the national parks.

Since no evidence is presented in support of these assertions, either here or in the feasibility-study report, one must conclude that they are considered to be self-evident truths — which in turn shows that the authors of this key project document either had no awareness of the notoriously complex issues involved in identifying and measuring rangeland degradation, or that they simply chose to ignore them. Either way, there could be no better illustration of the way in which policy and planning decisions, having momentous long-term implications for the well-being of people and the natural environment, can be based on assessments and assumptions that bear hardly any relation to the world as it really is.

The feasibility-study report avoids the question of resettling people living within the park boundaries, by pretending that they do not exist. The 'preliminary phase' document takes the bull by the horns, stating that

> One of the first tasks of the project will be to arrange the resettlement of families living in the parks (480 in Nechisar and some 1200 in Omo) with the collaboration of the local administration. The project will assist with the timely supply of materials (for building new houses), hand tools and where necessary food aid for six months to allow families to re-establish themselves. There will also be social infrastructure by way of boreholes, schools and clinics provided. (p.10)

There is some ambiguity about the number of people it is planned to move. If the figure of 1,200 really does refer to 'families', then it is being proposed to move 7-8,000 people from the Omo Park — which would more than account for the entire Mursi population. A page earlier, however, it is said that 1,200 'squatters' will be moved, though it is not explained how these individuals will be identified. Those who are not to be resettled will be 'sensibilised ... in order to minimise conflictual or unsustainable resource use' (p. 9). There is no indication of how it is proposed to achieve this 'sensibilisation'; nor is there any mention of the need to arrive at workable proposals to ensure that local people gain tangible, realistic, and continuing benefits from wildlife conservation and tourism, despite the insistence of the feasibility-study team that, unless this can be achieved, there is no chance of the project achieving its conservation objectives. One can only conclude that those responsible for designing and implementing the project are not only prepared to see local people bear the main burden of its cost, even to the extent of being forced off their land with six months' food aid 'where necessary', but that they simply do not appreciate that

> The idea of biasing investments [in biodiversity] so that their distributional impact favours the local community is more than an issue of equity or fairness. It is an issue of efficiency because, unless the local community secures *net benefits* from the investment, it will have no incentive to sustain the investment. The incentive will remain for the local community ... to develop alternative uses which do secure higher local gains. (Pearce and Moran, 1994, p. 144, emphasis added)

Part IV: Conclusions and recommendations

Veterinary services

There can be no doubt about the objective need of the Mursi for veterinary help, nor about the extent of their interest in receiving it. At present there is, in effect, no government veterinary service for the Mursi and there is no prospect of this changing in the immediate future. Kassaye and Mohamed noted in their report that 'The MOA is training two animal health technicians who know the Mursi language. It will be a great help to the Mursi if one of these technicians is assigned to the Mursi area' (op.cit., p. 12). I do not know what stage has been reached in the training of these technicians. I understood from Ato Tekle, the Animal Health Assistant at Hana, that a plan to establish a veterinary station on the River Gura (in Bodi country, about 15km south of Hana), where a house has already been constructed, has had to be abandoned, at least for the time being, because of the difficult living conditions that would be encountered there. There is no plan to establish a veterinary station in Mursiland, while transport difficulties rule out any prospect of a mobile veterinary service for the Mursi being mounted from Hana in the foreseeable future.

The mobile service that Jonathan Geddes has provided since January 1994 has saved the lives of many cattle and thereby improved the short-term food security of many Mursi households, especially in the northern area. It has also had other important results. Firstly, it has demonstrated the enormous demand that exists among the Mursi for veterinary treatment. Secondly, it has shown that not only are herd-owners ready to pay for this treatment but that, at the price presently being charged by Geddes, there is sufficient cash in the community to pay for more treatment, if it were available. Thirdly, thanks to Geddes' good relationship with the herd-owners and his interest in, and respect for, their own knowledge, there has taken place a mutual learning exercise in which he has learnt about local diagnostic categories and treatments and the herd-owners have learnt much about the correct use and administration of veterinary drugs. Geddes would be the first to acknowledge, however, that the service he has provided, arising as it did as an emergency response to the critical losses sustained by the Mursi during the 1993-94 dry season, falls far short of what would be needed to create a sustainable improvement in animal health in Mursiland. Valuable and greatly appreciated though his help has been, therefore, it is very important that it should not be seen as justifying the continuing limitation of government veterinary services in the Sala-Mago Wareda to the area around Hana.

This study was initially planned as an investigation of the potential for training Mursi to be their own 'paravets', on the assumption that some form of community animal-health programme would be the most effective way to bring improved veterinary services to the Mursi. The benefits of decentralising animal-health services, especially in areas where communications are difficult and government employees find living conditions unattractive, have been frequently argued and do not need to be repeated (Halpin, 1981; Sandford, 1981; Almond, 1987 and n.d.; Grant, 1992; Obel-Lawson, 1992; Grandin *et al.* 1991). Nor is there any doubt that the Mursi themselves would see this as the most effective way of improving the health of their animals. At the meeting of local herd-owners which I instigated to discuss possible external assistance, one man spoke for the whole group when he said:

> The only thing that can help us [with trypanosomiasis] is trypamidium. Let's buy it ourselves. Let's buy syringes and then ... we'll have our own supply. Then, when we have a sick animal, we can treat it ourselves. We Mursi pick things up quickly. Now that we have seen how it's done, we can do it ourselves. In time, a few people will get really skilled at it. (Speaker 8)

I was also frequently reminded that, during the rinderpest-eradication campaign, many Mursi herd-owners had been allowed by the hard-pressed vaccinators to vaccinate their own animals.

Among the many lessons that have been learnt by those who have set up paravet projects in Africa, three would seem particularly relevant to any attempt to do so among the Mursi. Firstly, in areas where there is considerable indigenous knowledge of cattle husbandry and a high cultural value attached to it, the most effective approach may be to train livestock owners themselves in the administration of drugs. In their review of an Intermediate Technology Development Group training programme for Community Animal First Aid Workers (CAFAWs) among the Pokot, a transhumant pastoral people in Baringo District, Kenya, Grandin et al. identify what they describe as a 'socio-cultural flaw in the project design'.

> Although all the farmers met with as part of the review were pleased with the CAFAW training and the increased supply of drugs, information available indicated that there are not traditional animal health practitioners in the Pokot area. It appears that as a matter of cultural pride adult men feel that they should be able to diagnose and (to the extent that treatments were available) treat their own animals. (1991, pp. 23-24)

As the comment quoted in the preceding paragraph illustrates, this is certainly true of the Mursi also. It was found with the Pokot project that

> ... many CAFAWs have already begun to train farmers in proper dosage rates and there is strong pressure (from both farmers and CAFAWs) for future project activity to involve direct farmer training.
>
> A second phase for the project has thus been designed in which CAFAWs will be encouraged to simply sell medicines to livestock owners, who will be trained directly in how to administer the correct dose of the correct drug for each of the common diseases. (Grandin et al., 1991, p. 24)

A Mursi paravet programme, then, should focus from the start on 'direct farmer training' rather than treatment of livestock. Herd-owners certainly need to be instructed in the use of drugs and, especially, to be convinced of the need to follow correct dosage rates. They also need to know when to treat. This information would probably be most quickly and effectively assimilated if it came from fellow Mursi.

Secondly, unless a paraveterinary programme increases the availability of 'serious' drugs, it is unlikely to be highly regarded by herd-owners, nor is it likely to make a big impact on the major disease problems of the area. The Mursi would have very little interest in any programme to improve the health of their animals if it did not give them greater access to powerful veterinary drugs, and especially trypamidium. Since present regulations would not allow Mursi paravets to carry and/or sell such drugs, a special arrangement would have to be made with the Ministry of Agriculture to make this possible. There is also the general problem of drug supply, given the extreme shortages that already exist. It has already been noted that all the drugs at present allocated to the Sala-Mago Wareda by the Ministry of Agriculture are used to treat Bodi animals, and that the reason for this is the practical difficulties encountered by the veterinary staff in reaching the Mursi. It was interesting to note, however, Ato Tekle's opinion that the Mursi have better (that is, more healthy) grazing areas than the Bodi, and that their cattle are less exposed to disease. This may be true or it may be a convenient, if genuinely held, belief, used to justify the continuation of an inequitable allocation of public resources; or it may be both of these. In any case, it seems highly unlikely that any significant extension of veterinary services to the Mursi, whether or not through paravets, could occur unless the Ministry of Agriculture were able to allocate drugs specifically for the treatment of Mursi animals.

Thirdly, it is vital that paravets have regular contact with qualified veterinary staff who can give them technical and moral support and monitor their activities (cf. Kassaye and Mohamed, op. cit., p. 13). This would be particularly so in the present case, if the Ministry of Agriculture were to allow Mursi paravets to carry scheduled drugs. It is difficult, however, to imagine such back-up being provided by the government veterinary service unless its human, financial, and logistical resources at Hana were greatly increased and a veterinary station, with a resident animal-health

technician, were established in Mursiland itself. Such a station could be located on either the Mara or Moizoi Rivers; although the second location, being more central, would allow easier access to the south of the country.

Bearing these points in mind, and assuming that ways can be found to solve the problems of drug supply, monitoring, and technical support, it is possible to imagine a Mursi paravet service consisting of at least four paravets, one each for the Baruba, Mugjo, and Biogolokare groups and one to cover the two smaller southern groups, Ariholi and Gongulobibi. The trainees would be selected by a meeting of each group, called specifically for the purpose. Once they were trained, their role would be not only to treat animals but also to demonstrate correct procedures and dosage rates and to sell drugs to herd-owners. They would be backed up in the first instance by an animal-health technician, based preferably at Moizoi. Jonathan Geddes will no doubt also be available, after he returns from home leave, to give them additional support and advice. An equivalent programme should be established at the same time for the Bodi.

Water

In view of the heavy animal losses sustained by the Mursi during the 1993-94 dry season, and bearing in mind the principle that prevention is better than cure, it would be pointless to introduce an improved veterinary service unless ways could also be found to solve the water problem described earlier. Three points need to be emphasised. Firstly, the drought conditions of the 1993-94 dry season were merely a particularly severe manifestation of a continuing and growing problem. It has become 'normal' over the past twenty years for cattle to be taken to the Sala and Omo rivers during the dry season, while relatively tsetse-free grazing in the Elma Valley has been under-used. Secondly, the quality and resilience of this grazing is much higher, because of different soil conditions, than in the much more heavily used wet-season grazing areas between the Elma and the head streams of the Omo's westward-flowing tributaries. Thirdly, therefore, if 1993-94 was a 'bust' year for Mursi cattle, this was not the result of their numbers exceeding the 'ecological carrying capacity' of the rangeland, but of their being exposed, through shortage of water in the Elma, to an increased risk of disease and to the stresses and strains of long treks to water. Even the animals — mostly calves — that were described as having died of 'thirst' did so because the settlements had to be built a good distance from the tsetse-infested river courses, making it difficult, given a shortage of containers, to provide them with sufficient water.

The overwhelming importance attached by the Mursi to the water problem was evident at the meeting held to discuss both this and veterinary issues on 6 September. Speaker after speaker insisted that 'The real problem we have is water' (Speaker 8). The few who made any mention of disease did so only to emphasise that the solution lay in providing permanent water points in the Elma valley, so that it would not be necessary to take the cattle to the Sala, Omo, and Mago. They were well aware of the problems that would result from too heavy a concentration of settlements, and suggested that as many water points as possible — up to 10 — be put in along the length of the Elma, so that the cattle of each *buran* could remain in their own grazing areas throughout the dry season. (This point was probably made with added feeling because the men who attended the meeting were all from the Baruba and Mugjo *buranyoga* and regularly have to give their southern neighbours access to their watering points.) It was frequently pointed out that, if more use were made of the Elma, pressure would be reduced on the central area, giving the grass a chance to recover. Then, after a year or two, it would be possible to burn the grass, generating enough heat to destroy bushes and shrubs and reversing the change to a more woody vegetation that has been taking place over recent years. The unfortunate consequences of increased settlement in the vicinity of the hand-dug well at Goroburai were frequently mentioned and there were no calls for more permanent water points in the central area. Several speakers, however, pointed to the need for improved water supplies in the bushbelt cultivation areas, which would reduce the time women had to spend in their daily trips to water, as well as making it feasible to clear new areas for rain-fed cultivation which were at present too far from a water supply (Speaker 2 and Speaker 4). At the time of the study, women who were cultivating in the Deholo valley were dependent on the Mara water holes, which were, for some, an hour's walk from their cultivation areas. Women cultivating along the River Kulkul were walking even farther, to

water holes in the bed of the River Ngurug (Figure 4).

Introducing permanent water points to increase the area available for dry-season grazing is one of the oldest strategies of pastoral development, the most widely used technique being the sinking of boreholes (machine-drilled holes of less than 300mm diameter, usually fitted with mechanical pumps). The attraction of boreholes (as opposed to hand-dug wells) as a permanent water supply is that not only do they bring a relatively large volume of water to the surface, but, because they are independent of fluctuations in the local rainfall, there is little or no risk of their running dry, even at the driest time of the year. Obviously then, this would be the solution preferred by the Mursi. Experience in other parts of Africa, however, has highlighted a number of disadvantages of borehole development, particularly the risk of environmental degradation due to an unsustainable growth in livestock numbers, conflict between competing user groups, and a high risk of technical failure.

Until recently it was part of the conventional wisdom of rangeland ecology to see any change in the existing pattern of vegetation in pastoral areas (such as water development is bound to bring about) as a step in the direction of 'desertification'. With the advent of the 'new thinking' referred to earlier, and the challenge this has brought to standard conceptions of 'carrying capacity', such concerns have become less prominent. This is because of the realisation that in so-called 'non-equilibrium environments' it is unpredictable exogenous factors, such as rainfall, which control herd growth, not the availability of forage (Behnke, 1992; Behnke and Scoones, 1993). In such environments, 'land degradation is not the major issue it was once assumed. Therefore boreholes and water points should continue to be a priority in areas where water is a limiting factor' (Scoones, op. cit., p. 35).

Apart from this general point, there are other reasons for believing that the development of boreholes in the Elma Valley should not be ruled out on environmental grounds. Firstly, the depth of the top soil and quality of the grass make it a more resilient environment than the central area, which is used for wet-season grazing. Secondly, and for the same reason, it is unsuitable as a grazing area in the wet season, when the grass gets too tall, and it is, as the Mursi say, too 'cold' for the cattle. Thirdly, increased use of the Elma Valley during the dry season, even if it created temporary 'sacrifice areas', would relieve the hard-pressed and more fragile central area, thus spreading grazing pressure more evenly across the rangeland as a whole. As Sandford points out, 'The more resilient the environment, the longer the dry season, the more variable the rainfall, the slower the intrinsic growth rate in numbers, then the lower the risk and the greater the advantage involved in accessible and sacrifice areas forming high proportions of the total zone' (1983, p. 77).

It was frequently stressed by speakers at the 6 September meeting (for example, by Speaker 4) that water points should be so distributed along the course of the Elma that the cattle of each *buran* could graze throughout the dry season in the grazing areas traditionally owned by that *buran*. Although I have no evidence of outright conflict between different local groups over scarce water supplies, even during the 1993-94 dry season, these comments presumably indicate that a certain degree of friction is generated when primary users have to give others access to their water points and grazing areas at critical times. It would be essential, therefore, for new water points to be located according to the existing allocation of primary user rights to grazing and water among *buranyoga*. In other words, each new water point would have to be seen as the property of the *buran* in whose territory it was situated and the members of that *buran* would have primary user rights over it. If this principle were followed, and each *buran* had at least one permanent water point of its own, the result would more likely be to reduce rather than increase the potential for conflict between different *buranyoga* over scarce water supplies.

It is not, however, conflict between different local groups already present in an area that is most commonly warned against as a possible consequence of borehole development, but conflict between local users and people coming in from outside.

> ... once a potentially stable clean water supply is introduced into an area, it almost automatically introduces a new population centre composed of representatives of the institutions of modern society. [In time] agriculturalists as well as outside pastoralists are attracted to the water. Thus, what may have originally been designed for

> a relatively small pastoral population in the end has to supply an entirely new community. (Hatfield and Kuny, 1976, p. 18, quoted by Sandford, 1983, p. 78)

Such 'changes in resource access' (Scoones, op. cit., p. 35) are now regarded as a more serious danger of borehole development than environmental degradation. Sandford, commenting on the implications of 'Recent thinking in range ecology' which 'suggests that in non-equilibrial systems the danger to the environment from overstocking is relatively small', writes:

> The previously much criticised veterinary and water development programmes in retrospect now seem less ill advised, except in so far as the former were sometimes inefficiently implemented and the latter had some adverse equity implications that allowed 'outsiders' to gain access to what up until then had exclusively been pastoralists' resources. (1994, p. 180)

To what extent would such 'adverse equity implications' be likely to follow borehole development in the Elma Valley?

We can divide potential 'outsiders' into two categories: (a) neighbouring groups of herders and/or cultivators moving in to take advantage of improved rangeland and/or agricultural resources; and (b) government officials, missionaries, and traders. It is very difficult to envisage the Mursi, who are by now well armed with Kalashnikovs, allowing the Bodi, Hamar, or Nyangatom to usurp their primary user rights over the Elma Valley. For the same reason, it is even more difficult to envisage highland cultivators moving in, unless this were part of a government-sponsored resettlement scheme. The Elma Valley would hardly be an attractive posting for government officials and traders, but if water development there did lead to the setting up of facilities such as a clinic, veterinary station, shop, and school, this could only be judged a benefit and would certainly be welcomed by the Mursi.

There remains the point that boreholes have a high risk of technical failure.This is probably the most telling objection to borehole development in the Elma Valley. It must also be expected that they would be easy targets for vandalism by enemy groups (notably the Hamar), just as the Goroburai monopump has been.

Hand-dug wells (assuming that geological conditions made them feasible) would be cheaper to construct and cost less to maintain. They would also provide less water, even when fully operational, than boreholes, and therefore be less likely to encourage permanent settlement. If provided with pumps, however, they would also be liable to breakdown and vandalism. If the water were elevated by rope and bucket, the labour involved in raising sufficient water to satisfy, say, 500 animals (at least 10,000 litres) would be considerable and beyond the organisational capacity of current Mursi stock-watering practices. They would also be liable to fail at the driest times of the year.[10]

An alternative to both boreholes and wells would be to increase the supply of surface water by excavating ponds and building dams across some of the many seasonal streams that flow down from the Dara range and the Omo-Mago watershed into the Elma. The success of dams, of course, would depend on the amount of run-off they were able to retain, and for how long into the dry season. This in turn would depend on the *loru* rainfall, which is notoriously erratic and, according to the Mursi, diminishing from year to year. The attraction of dams and ponds, apart from the fact that they are relatively cheap and simple to construct and maintain, is that they do *not* provide a permanent source of water, so that they do not hold cattle down to one area throughout the dry season.

Since none of these options for water development is without its difficulties and disadvantages, they should all be investigated with an open mind and possibly a mixture of solutions employed. The first priority, therefore, is for an experienced water engineer to assess the technical feasibility of the various options. Once such a survey has been completed, or while it is in progress, it will be possible to have further discussions with the people about the optimum number and location of water points, whether boreholes, hand-dug wells, ponds, or dams, and about the timing and organisation of the work that would be involved in constructing them. It is very important that the local groups (i.e. *buranyoga*) who will have primary user rights to these resources should decide, in the light of the technical evaluation, where they are to be located.

There is, however, one very simple step that can be taken immediately: namely to supply herd-owners with plastic jerry cans for carrying

water to calves and sick animals that are not able to make long treks to water. This would help them to keep such animals alive during the height of the dry season, when they have to build their cattle camps long distances from tsetse-infested water points. Women carry water in large earthenware pots, which they make themselves, but during the dry season they spend most of their time at the Omo, looking after the flood-retreat crop. There is, furthermore, a very strong cultural taboo against men carrying water pots — even when empty — which does not apply to jerry cans. Used 4-litre cooking-oil containers, bought in the weekly market at Berka for between ETB 3 and 4, are much in evidence among the Mursi, but they are simply too small for the purpose of carrying water for livestock. The men I spoke to on this subject said that 20-litre jerry cans would be the best size.

Wildlife conservation

If the Southern Ethiopia Wildlife Conservation Project proceeds along the lines suggested in the various documents discussed earlier, the Mursi will, at best, be prohibited from making use of the Elma Valley for grazing and, at worst, be forced off their land altogether. They themselves are totally unaware of either danger. They have never been officially informed that the Elma Valley falls within the boundary of the Mago Park. When I mentioned this at the 6 September meeting, there was a response of bemused incredulity. The feasibility study carried out by Agriconsulting contained no element of consultation with local people. There is an obvious need for lobbying and advocacy on their behalf to ensure that their interests are belatedly taken into account and their rights respected in the design and implementation of the project. As Pearce and Moran have pointed out, this is a matter of 'efficiency' as well as 'equity'. There is no doubt that, unless the negative approach to the role of local people in 'conservation development' which is implicit in the project documents is radically revised, the SEWCP will be the most expensive failure yet in the relatively short history of wildlife conservation in Ethiopia.

What is needed is a new feasibility study, specifically designed to focus on what the Agriconsulting team chose to ignore, even while correctly identifying it as the key to successful conservation: the 'socio-cultural area'. This study, which would require months rather than days of field-work, would have the following objectives:

- to analyse the natural-resource management strategies of the Mursi and their northern neighbours, the Bodi, and to assess the environmental impact of these strategies, both positive and negative, over the past few decades; and
- to initiate a process of debate and discussion within local communities, aimed at formulating an administrative structure for the project, within which the representatives of those communities would have an active, decision-making role to play and which would enable local people to gain *net benefits* from wildlife conservation and tourism.

The study should result in detailed proposals and not simply pious expressions of intent. A key difficulty in the planning and operation of all kinds of community-development projects has been how to define the 'community' as an empirical entity (Hogg 1992). This applies to one of the best-known examples of community-based resource management in Africa, the Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) in Zimbabwe.

> One of the main obstacles to progress [in the CAMPFIRE scheme] has been the unwillingness of [district] councils to devolve real responsibility and power to more local communities to manage their own wildlife resources ... while the definition of what a community is remains problematic, three characteristics are necessary components of a communal property regime:
> - the scale (both demographic and spatial) must be small enough to provide conformity to rules largely by informal group pressure;
> - the costs and benefits must be relatively evenly distributed among members; and
> - sanctioned authority, linking responsibility to control capacities, must be present. (IIED, 1994, pp. 94-5)

Fortunately, it would not be necessary to create new local-level institutions of this kind in order to enable the Mursi to have a voice in the management of the SEWCP, since their existing *buranyoga* have precisely the three characteristics just described. The relative economic

homogeneity of the Mursi, their egalitarian ethos, and their strong tradition of public debate and oratory make one confident that they would have no difficulty in adapting their existing methods of public decision-making to the demands of a genuinely participatory conservation project.

To call for a new and necessarily lengthy feasibility study goes much against the grain of the 'preparatory phase' document, with its talk of rapid environmental degradation and the consequent need for urgent action. Such talk, however, has more to do with getting and spending development funds than with tackling environmental degradation in the Lower Omo Valley, for which there is not a shred of hard evidence in any of the project documents. One can understand the pressures there must be on politicians, civil servants, and their foreign advisers, competing for scarce resources, to emphasise the image of 'Africa in crisis'. Analogous pressures were felt by northern NGOs in their public fund-raising activities, until they realised that to use heart-rending images of starving Africans in their publicity was counter-productive. By spreading a false image of the passivity and helplessness of rural Africans, such advertising promotes inappropriate aid, which prolongs or increases the poverty and powerlessness it is intended to alleviate. Similarly, projects which are designed to appeal to (and which therefore confirm) the European myth of 'wild' Africa, brought to the brink of ecological disaster by the 'uncontrolled' use of natural resources by African farmers and herders, are more likely to precipitate that disaster than prevent or mitigate it.

It is not only that the SEWCP, as it stands, has the potential to violate the human rights of the Mursi, but also that failure to put the interests and well-being of the local *human* population at the centre of the project, by including them in its formulation and implementation, will ensure that it does not achieve its long-term conservation objectives. This point is well made, in a general sense, by Charles Schaefer in a review of *The Myth of Wild Africa: Conservation without Illusion* by Adams and McShane (1992).

> Through countless scientific and anecdotal case studies, Adams and McShane demonstrate that almost every conservation scheme conceived in the West, financed by Western aid and implemented by European or American naturalists has ignored the single most important factor in conservation: humans.
>
> The point of the title Conservation Without Illusion is that Africa's wildlife must live in an environment of increasing human population and, if species are to survive, a happy medium between the two must be reached. To accomplish this, the authors argue, Africans who have lived on land with wild animals as neighbours for hundreds of years must be the primary concern of conservation efforts. (1994, p. 51)

There are already a number of examples from African countries of imaginative attempts to come to terms with this surely obvious truth by involving local people, to varying degrees and with varying amounts of success, in the design and management of conservation projects. These countries include Kenya (Lindsay, 1987), Mali (Skinner, 1989, cited by McCabe *et al.*, 1992), Niger (Newby 1990, cited by McCabe *et al.*, 1992) and, perhaps best known of all, Zimbabwe (Murphree, 1991). It is surprising and disappointing, therefore, that the European Development Fund and the EWCO have not felt able to rise to the same challenge with the SEWCP. Given the substantial amount of money involved and the size and significance of the areas to be developed, there is the opportunity here for Ethiopia to develop one of the most exciting and influential wildlife-conservation schemes in Africa.

Summary of conclusions and recommendations

Veterinary services

1 The Mursi do not have access to government veterinary services.
2 The mobile service that Jonathan Geddes provided during 1994 showed that they have a very high demand for veterinary treatment and are willing to pay for it.
3 The Mursi themselves would see some form of decentralised, community veterinary service as the most effective way of improving the health of their animals.
4 A Mursi paravet programme should focus from the start on training herd-owners in the correct use of veterinary drugs.
5 The Mursi would have very little interest in any programme that did not improve their access to modern drugs, especially trypamidium.
6 A paravet service among the Mursi should consist of at least four paravets, one each for the Baruba, Mugjo, and Biogolokare *buranyoga* and one for the two smaller southern groups, Ariholi and Gongulobibi, backed up by an animal-health technician at Moizoi.
7 A similar service should be established simultaneously among the Bodi.

Water development

1 It would be pointless to increase access to veterinary services, unless ways can also be found to solve the water problem in the Elma Valley.
2 Improved water supplies are also needed in the bushbelt cultivation areas, to reduce the time spent by women spend on their daily trips for water.
3 The provision of boreholes in the Elma Valley should not be ruled out on environmental or equity grounds. The most telling objection to boreholes is their high risk of technical failure.
4 Permanent water points, whether boreholes or not, should be so distributed along the course of the Elma that the cattle of each *buran* can graze throughout the dry season in the grazing areas traditionally owned by that *buran*.
5 Each new water point should be the property of the *buran* in whose territory it is situated, the members of which would have primary user rights over it.
6 An experienced water engineer should assess the technical feasibility of the various options for water development (boreholes, hand-dug wells, ponds, and dams) in the Elma Valley.
7 The local groups which will have primary user rights to new water points should decide, in the light of the technical evaluation, where they are to be located.
8 A way should be found of supplying herd-owners with plastic jerry cans, preferably with a capacity of 20 litres. This would help them to keep their calves and sick animals alive during the dry season.

Wildlife conservation

1 If the Southern Ethiopia Wildlife Conservation Project proceeds according to current plans, the Mursi and other local people will be made to carry the heaviest burden of its costs. Moreover, the long-term conservation objectives of the project will not be achieved.
2 Pressure should be put on the European Development Fund, the EWCO, and the Regional and Zonal Governments to ensure that the Mursi gain *net benefits* from the project and therefore have a vested interest in its success. Otherwise, it is unlikely to achieve its conservation objectives.
3 The boundaries of the Mago Park should be altered, both as suggested by Sutcliffe and also to take account of the vital importance of the Elma Valley to the pastoral activities of the Mursi and, therefore, to the viability of their entire economy. This would mean realigning the western boundary of the Park, so that it follows the top of the Omo-Mago watershed, thereby enclosing the whole of the Mago Valley and excluding the whole of the Elma Valley.
4 All plans for the resettlement of 'families' or individuals living within the Omo and Mago parks should be dropped, and detailed plans should be prepared to give the Mursi a decision-making role in the design, implementation, and management of the project.
5 The Southern Regional Government should make gazettement of the parks conditional upon these changes being made to the project.

Notes

1 Catherine Schloeder, personal communication, June 1995.
2 In 1991 I was told by a Mursi that the rate was (or had been until recently) four torch-bulb bases filled with gold for one Kalashnikov.
3 According to Catherine Schloeder, who has studied photographic and satellite evidence, it is, however, unlikely that the bushbelt has grown in extent during the last 20 years (personal communication, June 1995).
4 W. P. Langridge, personal communication, 1974.
5 All personal names have been changed.
6 Jon Abbink, personal communication.
7 Catherine Schloeder, personal communication.
8 The official exchange rate was then approximately ETB3/£1. It is now (1995) approximately ETB10/£1.
9 Jonathan Geddes, personal communication.
10 Shortly before our visit, only one of 19 hand-dug wells in the Dimeka area of South Omo was working (Attilio Ascani, personal communication).
11 Two Mursi who could speak Amharic went to Hana and then to Jinka at the time of the planting of the rain-fed crop (March 1994), to ask the Administration for relief grain. The flood harvest, a few months earlier, had been very poor, due to a low Omo flood in August 1993.
12 This is the name given to the lower course of the Elma, where it joins the Sala.
13 The two men who went to Jinka to ask the Administrator for help returned with a lorry of relief grain, but only after a long delay, because mud had made the road across the Mago valley impassable. Meanwhile, a woman and her two small children had died of starvation at Moizoi.

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Appendix: A meeting to discuss disease and drought

On 6 September 1994, around 20 men from the Welya and other nearby settlements came together at my suggestion to discuss the problems of disease and drought. The eight speakers, who were all from the Dola *buran*, included some of the most influential men in the area. The meeting followed the usual pattern for a Mursi 'debate' (*methe*), in which speakers take it in turn to present their views, the more influential usually speaking towards the end (Turton, 1975). I recorded and translated all the speeches, but here present excerpts from only three of them.

Speaker 2

Isn't water the really important question now? If we lost so many animals last year — wasn't it because of drought? And now, as we sit here, isn't the Elma [the nearby water point] drying up? If we don't get rain in the next three days, where are we going to find water for the cattle — and for ourselves? ...

Let's talk about the water problem — forget hunger. Let's talk about cattle disease and water. Isn't drought the problem? If someone like this man [DT] were to come and say, 'Where shall we dig wells?', wouldn't we show him the rivers, one by one — our Mursi rivers? Didn't they dig over there [for the well at Goroburai], laboriously, with picks? But it only gave enough water for a handful of people. It gives even less now, so most people can't make use of it at all.

The important thing now is water — and cattle. Nowadays, a cow with five offspring is likely to have lost them all; a cow with three is likely to have lost them all. We Mursi are cattle people. When there is no grain, we depend on cattle.

What we should be talking about is water. Ideally we would have 20 wells to keep people and cattle spread out. Some would be in the cultivation areas and some in the grazing areas. If there were only four, the cattle would concentrate and there'd soon be nothing for them to eat. Ideally we'd have many wells. Tuli would have its well, Kamena would have its well, Lethathioi would have its well, Dogun would have its well, and so on. Wherever there was grazing — Dara, Mara, etc. — there would be a well. But if they're like the one at Goroburai, they won't not do the job ...

As for the cultivation rivers [westward-flowing Omo tributaries], if the same water points serve both people and cattle, there won't be enough water for the cattle. There should be separate wells in the cultivation areas, just for people — at Deholo, Kulkul, etc. That's all I have to say. I'm only interested in one thing: water.

Speaker 4

Yes, our cattle were hit by drought. They were hit by the sun and perished. And now we sit here hungry. We Mursi are people who depend on milk. The rains have not been good this year: the [rain-fed] crop was poor. So we are hungry.

What can we do? I don't know. Where shall we go to buy grain? I don't know. We've asked the government for grain. One lorry did come.[10] The people scrambled to get the grain and it fell off the lorry. Some people got none, some got hold of a sack and then dropped it as they ran. A lot was spilt and never reached anyone's stomach. We're hungry ...

Since you [DT] were here last [September 1992], we've been hungry and so have our cattle. The grass has gone, leaving the soil bare. We've had to go to the Sala and Mago for water. The nearest water from here is the Omo. But there's no grass there, only thick bush. All the cattle can do there is drink.

A lot of calves died [at the Omo]. A calf would force its way into the bush to get out of the sun, injuring itself on the thorns and branches. It would lie down and you couldn't get it to move, however much you hit it. You'd carry it back to the settlement and it would die that night or the next day. So many died, the place is littered with bones ...

The middle and upper course of the Elma is dry. There is water [at the height of the dry

season] in the Magoloin,[12] but there are also tsetse there — lots of tsetse. When the cattle drink there, they drink disease as well as water. The calves get diarrhoea. And *ke-a-sabai*: that's also caught at Magoloin. An affected animal runs off into the bush and its owner has to search for it in the heat of the day. It may be attacked by a hyena or fall down a steep slope and break its bones. That's what *ke-a-sabai* does.

We need a well in the Elma proper — where the tall *tawali* grass [*Panicum maximum Jacq.*] grows. There's water there. A long time ago a white man came here [to Warano] and looked [through an instrument] in the direction of the Elma and then towards the Omo and then back towards the Elma. He said there's plenty of [underground] water on both sides of this ridge. So we said let's dig for it: we are thirsty and hungry. He agreed and said he would go and get his equipment. We thought fortune was smiling on us, but he never came back. We can't get the water ourselves. We need the help of experts ...

We need enough water in the Elma to keep the cattle spread out. Mugjo people should have their own well upstream. If we all come together, the grass will disappear. Makaro people should have a well in the Lukwe river. Biogolokare people should have their own well. There are many of us, both people and cattle. If there were wells stretching all the way up the Elma, they [Mugjo, Biogolokare, Ariholi and Gongulobibi] would have enough water of their own and could keep to their own grazing areas. They know the grazing there — it's their country. There's plenty of grass. The problem is water.

As for us, this is our country, from the Ngurog river across to Betheroi on the other side of the Omo. Betheroi is our country. And up to the Mara and across to the Tuli. This is our country. It was our great-grandfathers' country. We've nowhere else to go. When drought comes, the cattle die, despite our efforts to save them. But some years we get good rain, there's plenty of water for the cattle, and they recover. That's how it is. We're staying here.

Let's have a well at Deholo [i.e., in the rain-fed cultivation area], under the cool shade of that huge *ragai* tree (*Tamarindus indica L.*), so that the women can use it. We are not going anywhere else to cultivate.

That's all I have to say.

Speaker 8

... The real problem we have is water. If we could get water from the Elma, the cattle wouldn't graze this side of it at all [in the dry season]. They'd drink in the Elma and graze to the west of it. Then the grass would grow up here. It could be burnt off and the bush with it. If the *ragai* plant is spreading here, it's because the cattle have trampled the grass on their way to water.

We have to [take the cattle to] places where there's no grass, because that's where the water is. There's nothing for the cattle to eat: they just drink and die, drink and die. If there were water over there [in the Elma Valley], the cattle could go there and eat the grass until the rains came. The problem is water.

And also *dugi* [trypanosomiasis]. The only thing that can help us with this is trypamidium. Let's buy it ourselves. Let's buy syringes and then, when he [JG] goes [on leave], we'll have our own supply. When we have a sick animal, we can treat it ourselves. We Mursi pick things up quickly. Now that we've seen how it's done, we can do it ourselves. In time, a few people will get really skilled at it.

And *ke-a-sabai* — it's killing the cattle. When an animal is affected, it just goes round and round. Two nights ago Charamalugseno's big ox got it and today it's being eaten. It was circling round and round and now it's being eaten.

The cause of *dugi* is the tsetse fly. In the past there were just a few of them. Now you see them everywhere: covering an animal's tail, in the grass. When a vehicle comes, they swarm after it. They're no longer just in the rivers: they're everywhere; in the grass. Wherever a car goes, the tsetse follow it.

Yonatan [JG] helped us by bringing trypamidium last dry season. The watering places along the Omo were strewn with cattle bones. The same at the Mago. Cattle were driven at night from the Elma valley as far as the Sala to drink.

Bones were everywhere on this ridge. Vultures gathered as they used to when the cattle were dying from *gunchi* [rinderpest]. So Yonatan came and helped us.

The main diseases are *ke-a-sabai* and *dugi*. *Rokono* comes occasionally. Then there's *hohu*, *kuruti*, *kaukau*, and *tara*. With *tara* the liver swells up. When the animal dies, it's as big as this. You can't eat it. Then there's *hereto*, *lungidai*, *gunchi*, *nyambarr*, blindness, *baga* ... But the worst of all is *dugi*.

When we have no sorghum, we all depend on cattle. When we have someone who is ill, we kill an animal [to make broth for the patient]. When we marry, we use cattle as bridewealth. A man without cattle will die without a wife. If we didn't have to pay bridewealth, but could just marry freely, like white people, the population would grow so fast there'd be nowhere for the cattle to graze. If there are still relatively few of us, it's because of cattle.

Cattle are our real food. The government has helped us with relief grain. But if there's none to be had, we starve. Last dry season we were starving and — what's their names? — went to Jinka. They were there for ages because of mud. By the time they got back [with a lorry load of grain], some people had died of starvation.[13] This year, with the help of *Tumwi* [God], we got a small harvest, so here we are ...

We need medicine for *ke-a-sabai* and *dugi* — these two. They affect adult cattle, cows that have just given birth, oxen, and bulls. Your child comes to you in the evening carrying a *bagai* [milk container] and crying 'Where is my cow?', even though it's dead and he saw it being eaten. You say, 'Why are you asking? Isn't it dead? Didn't it get *ke-a-sabai* and die?' But he keeps crying, 'Dada, give me some milk. Mama, give me some milk.' Hearing this can make a person commit suicide. That's *ke-a-sabai* for you.

That's all I have to say.